



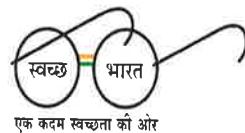
क्रमांक. / No. H-18026/1(TS&TD)/2016-CDN

भारत सरकार / Government of India

गृह मंत्रालय / Ministry of Home Affairs

समन्वय निदेशालय / Directorate of Coordination

(पुलिस बेतार) / Police Wireless



खंड संख्या 9/ Block No. 9,

केन्द्रीय सरकार कार्यालय परिसर /CGO Complex,
लोधी रोड, नई दिल्ली-3/Lodhi Road, New Delhi-3

दिनांक / Dated 17th January 2018

Sub: - Technical Specifications and Trial Directives of Digital Radios

The Technical Specifications and Trial Directives of under mentioned Digital Radios have been finalised.

- A. **Digital VHF Conventional Radios**
- B. **DMR Tier-III Radio Trunking**
- C. **APCO 25 Phase-II Radio Trunking**
- D. **TETRA Radio Trunking**

2. MHA has approved that these specifications & trial directives may be used by State /UT Police and CAPFs for procurement of two way Digital Radios & Digital Radio Trunking networks as per applicable GFR or State Financial Rules.

3. Further, if required, due to any specific requirements, the Technical Specifications may be slightly modified by the user organisations with approval of Competent Authority.

4. The above mentioned technical specifications and trial directives are uploaded at DCPW website i.e. www.dcpw.nic.in under “Technical Specifications” tab.

(Rajesh Ekka)

Deputy Director (CDN-I)
Tele No.: 011-24361767

To,

1. Director Generals CAPFs
2. Director Generals State / UT Police
3. Commissioner of Police Delhi, Mumbai, Kolkata & Chennai

Copy to:

CEO, Government e-Market (GeM), New Delhi: - with a request to kindly include the above items in GeM portal

QRs of DIGITAL CONVENTIONAL RADIO DMR Tier II

A. HANDHELD RADIO

1 GENERAL		TRIAL DIRECTIVE
1.1 Frequency Range	VHF / UHF (Organisation may specify)	User / DCPW to test
1.2 TDMA	2 – Slot	User / DCPW to test
1.3 Channel Capacity	255 or more (Set with display) 16 Channels (Set without display)	User / DCPW to test
1.4 Channel Spacing	12.5KHz	User / DCPW to test
1.5 Battery Capacity	Li-ion/Li-Poly rechargeable battery of capacity 2000 mAh or higher capacity. Complying applicable BIS Standard	User / DCPW to test
1.6 Average battery duty cycle 5/5/90	Digital:10 hrs or more Analog:8 hrs or more	User / DCPW to test
1.7 Frequency Stability	±1.5 PPM or better	User / DCPW to test
1.8 Antenna Impedance	50Ω	User / DCPW to test
1.9 Antenna	Helical Antenna	User / DCPW to test
1.10 Weight	Less than 500 gms with battery	User / DCPW to test
1.11 EMI/EMC	ETSI EN 301 489-1 & ETSI 301 489-5/	OEM Certification supported by International Recognised Laboratory
1.12 Air Interface Standards	Shall be open Standards DMR Tier-II	OEM Certification supported by International Recognised Laboratory
2 TRANSMITTER		TRIAL DIRECTIVE
2.1 RF Power Output	VHF - 1 to 5 Watts (programmable) UHF – 1 to 4 Watts (programmable)	User / DCPW to test
2.2 FM Emission	11K0F3E, 7K60FXE , 7K60FxD , 7K60FXW	User / DCPW to test
2.3 Digital Modulation	4FSK	User / DCPW to test
2.4 Modulation Limiting	±2.5KHz @ 12.5 KHz	User / DCPW to test
2.5 FM Hum & Noise	-40 dB or better	User / DCPW to test
2.6 Adjacent Channel Power	-60 dBc or better	User / DCPW to test
2.7 Audio Response	+1,-3dB	User / DCPW to test

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2.8	Audio Distortion	Less than 3 %	User / DCPW to test
2.9	Digital Vocoder	AMBE +2	User / DCPW to test
2.10	Communication Security (Optional)	System should have in built encryption and should also have provision to support 3 rd Party Encryption.	User / DCPW to test
3	RECEIVER		
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD) or better	User / DCPW to test
3.2	Sensitivity (digital)	0.30µV at 5% BER or better	User / DCPW to test
3.3	Adjacent Chanel Selectivity	60dB or better	User / DCPW to test
3.4	Inter-modulation	70dB or better	OEM Certification supported by International Recognised Laboratory
3.5	Audio Output	Minimum 500 mW	User / DCPW to test
3.6	Audio Distortion	Less than 3 %	User / DCPW to test
4	ENVIRONMENTAL		
4.1	Operating Temperature	-30°Cto+55°C	OEM Certification supported by International Recognised Laboratory
4.2	Storage Temperature	-40°Cto+70°C	
4.3	Humidity	95% Max. at +40° C non-condensing	
4.4	Vibration	MIL-STD -810 F/G	
4.5	Shock & Drop	MIL-STD -810 F/G	
4.6	Water intrusion & Dust	MIL-STD -810 F/G or IP-67	
4.7	Salt	MIL-STD -810 F/G	
4.8	Rain	MIL-STD -810 F/G	
4.9	Low Pressure	MIL-STD -810 F/G	

Feature wise Configuration:

5	ACCESSORIES		
5.1	Battery charger	230V \pm 10%, 50Hz	User / DCPW to test
5.1.1	Input voltage	As per battery pack (Information will be provided by OEM/ Vendor).	User / DCPW to test
5.1.2	Output Voltage	Li-ion / Li-Poly	User / DCPW to test
5.1.3	Type of Battery Charger		

5.1.4	Protection	(1) Reverse polarity protection (2) Short circuit protection	User / DCPW to test
5.1.5	Indication	Visual indication for all modes of charging status	User / DCPW to test
5.1.6	Charging time	Standard chargers -- 6 to 14 Hrs Rapid Charger -1 to 3 Hrs	User / DCPW to test
5.1.7	No. of Charging Pocket	1/2/6 (vendor to quote accordingly)	User / DCPW to test
5.11	Hand free Kit (VOX unit with PTT) (optional).	The offered sets should be compatible with any one or more of the following variants <ol style="list-style-type: none">1. Bone Conduction2. Ear Plug3. Headphone, etc.	User / DCPW to test
5.12	Programming Kit	All necessary Software and Hardware required for programming of the set independently for lifelong support with regular updates.	User / DCPW to test
5.13	Literature	<p>a) User manual with each radio sets should be provided free of cost in soft as well as hard copy.</p> <p>b) Technical repairing & maintenance manual, with complete block diagram, circuit layout, PCB layout, component & wiring diagram etc should be provided as per user's requirement in soft as well as hard copy.</p>	User / DCPW to test
5.14	No. of Battery	Two lithium-Ion or Li-polymer batteries with each radio set.	User / DCPW to test
5.15	Case	One good quality case with belt clip & shoulder strap to house the Radio Sets in operation.	User / DCPW to test
6 Configuration VH1 (without display)			
6.1	Simple press to talk.	User / DCPW to test	
6.2	Low battery alert.	User / DCPW to test	
6.3	Continuous Tone Coded Squelch System (CTCSS)	User / DCPW to test	
6.4	Mixed Mode Operation (analog and digital)	User / DCPW to test	

7 Configuration VH2 (with display)		
7.1 All features of configuration VH1.	User / DCPW to test	User / DCPW to test
7.2 Any one of 2-Tone/5-Tone/ DTMF signalling.	User / DCPW to test	User / DCPW to test
7.3 Busy Channel Lockout.	User / DCPW to test	User / DCPW to test
7.4 Selective call Decode / Encode.	User / DCPW to test	User / DCPW to test
7.5 Capable of VOX hand free operation.	User / DCPW to test	User / DCPW to test
7.6 PTT ID Encode.	User / DCPW to test	User / DCPW to test
7.7 Channel Scanning with call quieting facility.	User / DCPW to test	User / DCPW to test
7.8 Emergency SOS/SIREN	User / DCPW to test	User / DCPW to test
7.9 Talk around Mode	User / DCPW to test	User / DCPW to test
7.10 Automatic Number Identification (ANI)	User / DCPW to test	User / DCPW to test
7.11 Text messages and predefined message (Optional with keypad)	User / DCPW to test	User / DCPW to test
8 Configuration VH3 (with GPS) -		
8.1 All features of configuration of VH2.	User / DCPW to test	User / DCPW to test
8.2 Should have built-in GPS feature with following specifications:	User / DCPW to test	User / DCPW to test
i. Time to First Fix (TTFF) cold start : <2minutes	User / DCPW to test	
ii. Time to First Fix (TTFF) hot start : <20seconds		
Horizontally accuracy : <10 meters		

User Organisation may choose any of the above configurations.

ORs of DIGITAL VHF CONVENTIONAL RADIO

B. MOBILE RADIO

		TRIAL DIRECTIVE
1	GENERAL	
1.1	Frequency Range	VHF / UHF (Organisation may specify)
1.2	TDMA	2 – Slot
1.3	Channel Capacity	255 or more (Set with display)
1.4	Channel Spacing	12.5KHz
1.5	Operating Voltage	10.8 V to 15.6 VDC
1.6	Protection	a) Reverse polarity protection b) Protection against high VSWR
1.7	Frequency Stability	±1.5 PPM or better
1.8	Antenna Impedance	50Ω
1.9	Weight	Less than 2 kg
1.10	EMI/EMC	ETSI EN 301 489-1 & ETSI 301 489-5/
1.11	Air Interface Standards	Shall be open Standards DMR Tier-II
2	TRANSMITTER	
2.1	RF Power Output	5 to 25 Watts or More (programmable)
2.2	FM Emission	11K0F3E, , 7K60FXE , 7K60FxD , 7K60FXW
2.3	Digital Modulation	4FSK
2.4	Modulation Limiting	±2.5KHz @ 12.5 KHz
2.5	FM Hum & Noise	-40 dB or better
2.6	Adjacent Channel Power	-60 dBc or better
2.7	Audio Response	+1,-3dB
2.8	Audio Distortion	Less than 3 %
2.9	Digital Vocoder	AMBE +2
2.10	Communication Security (Optional)	System should have in built encryption and should also have provision to support 3 rd Party Encryption.

Digital VHF Conventional Radio

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3 RECEIVER		User / DCPW to test User / DCPW to test User / DCPW to test OEM Certification supported by International Recognised Laboratory User / DCPW to test User / DCPW to test
3.1	Sensitivity (Analog)	
3.2	Sensitivity (digital)	
3.3	Adjacent Chanel Selectivity	
3.4	Inter-modulation	
3.5	Audio Output	
3.6	Audio Distortion	OEM Certification supported International Recognised Laboratory
4	ENVIRONMENTAL	
4.1	Operating Temperature	
4.2	Storage Temperature	
4.3	Humidity	
4.4	Vibration	MIL-STD -810 F/G
4.5	Shock & Drop	MIL-STD -810 F/G or IP-54
4.6	Water intrusion & Dust	MIL-STD -810 F/G
4.7	Salt	MIL-STD -810 F/G
4.8	Rain	MIL-STD -810 F/G
4.9	Low Pressure	

User Organisation may choose any of the above configurations.

ORs of DIGITAL VHF CONVENTIONAL RADIO

C. REPEATER

1 GENERAL		TRIAL DIRECTIVE
1.1 Frequency Range	VHF / UHF (Organisation may specify)	User / DCPW to test
1.2 TDMA	2 – Slot	User / DCPW to test
1.3 Operating Mode	Dual standard (Digital & Analog)	User / DCPW to test
1.4 Operating Selection	Fully automatic for Analog & Digital	User / DCPW to test
1.5 Channel Capacity	16 or more	User / DCPW to test
1.6 Channel Spacing	12.5 KHz	User / DCPW to test
1.7 Operating Voltage	11.25VDC and 230 VAC \pm 10%, 50 Hz \pm 1 PPM or better	User / DCPW to test
1.8 Frequency Stability	Ethernet port for IP connectivity	User / DCPW to test
1.9 Interface	50Ω	User / DCPW to test
1.10 Antenna Impedance	100 %	User / DCPW to test
1.11 Duty Cycle	Less than 15Kg	User / DCPW to test
1.12 Weight	Indicator for Transmit & Receive	User / DCPW to test
1.13 Display	Better than 1.5	User / DCPW to test
1.14 VSWR	Reverse polarity	User / DCPW to test
1.15 Protection	ETSI EN 301 489-1 & ETSI 301 489-5	OEM Certification supported by International Recognised Laboratory
1.16 EMI/EMC		
1.17 Air Interface Standards	Shall be open Standards DMR Tier-II	OEM Certification supported by International Recognised Laboratory
2. TRANSMITTER		
2.1 RF Power Output	25 to 50 Watts (programmable)	User / DCPW to test
2.2 FM Emission	11K0F3E , 7K60FXE, 7K60FX, 7K60FXW	User / DCPW to test
2.3 Digital Modulation	4FSK	User / DCPW to test
2.4 Modulation Limiting	\pm 2.5 KHz @ 12.5 KHz	User / DCPW to test
2.5 FM Hum & Noise	-40 dB or better	User / DCPW to test
2.6 Adjacent Channel Power	-60 dBc or better	User / DCPW to test
2.7 Audio Response	+1, -3db	User / DCPW to test
2.8 Audio Distortion	Less than 3 %	User / DCPW to test
3 RECEIVER		

Digital VHF Conventional Radio

31st March 2014
Mr. S. M. Rangwala
HR Manager

10/03/2014

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3.1	Sensitivity (Analog)	0.30 μ V (12dB SINAD) or better	User / DCPW to test
3.2	Sensitivity (Digital)	0.30 μ V at 5% BER or better	User / DCPW to test
3.3	Image Rejection	65dB or better	User / DCPW to test
3.4	Adjacent Chanel Selectivity	60 dB or better	User / DCPW to test
3.5	Inter-modulation	70 dB or better	User / DCPW to test
3.6	Audio Distortion	Less than 3 %	User / DCPW to test
4	ENVIRONMENTAL		OEM Certification supported by International Recognised Laboratory
4.1	Operating Temperature	-30°Cto+55°C	
4.2	Storage Temperature	-40°Cto+70°C	
4.3	Humidity	95% Max. at +40° C non-condensing	
5	Accessories:		
5.1	Battery cable & Mounting fixtures	Should be supplied with Repeater	User / DCPW to test
5.2	Antenna	6 dB gain Omni Directional antenna with 45 meter RF Cable RG-217 for base station will be provided as per user's requirements.	User / DCPW to test
5.3	Programming kit	All necessary Software and Hardware required for programming of the set independently. Software must support latest Windows OS.	User / DCPW to test
5.4	Literature	i) Users manual with each radio sets should be provided free of cost in soft as well as hard copy. ii) Technical repairing & maintenance manual with complete block diagram in soft as well as hard copy.	User / DCPW to test

Note:-

1. The Technical Specifications & Trial Directives may be used for procurement as per the applicable GFR or State Financial Rules.

Technical Specifications may slightly be modified by user organisations for specific requirement, if any, with the approval of competent authority.

2. User Organisations may ask the vendors for lifetime support for supplied Software updates / patches , Warranty and Spare support as per the need.

3. If required, submitted OEM Certificates results may be verified from the available certified laboratories.


(Amar Singh Meena)
Assistant Commissioner of Police,
Delhi Police


(Rajesh Ekka)
Deputy Director,
DCPW


(Balkrishna Yadav)
Deputy Commissioner of Police,
Mumbai Police


(D. Mukhopadhyay)
Joint Director,
DCPW


(N.S. Lakshmi)
Deputy Inspector General,
Andhra Pradesh Police


(Devendra Singh)
Additional Director,
DCPW

QRS of RADIO TRUNKING SYSTEM - DMR Technology, Tier-III

A. BASE STATION UNIT (BSU) :

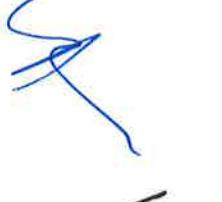
S.I. No.	SPECIFICATIONS			Trial Directives
1.1	GENERAL	400 MHz Band	OR	800 MHz Band
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band		User/ DCPW to test
1.3	Technology	TDMA- two slot DMR Tier-III Radio Trunking Protocol, ETSI Standard		User/ DCPW to test
1.4	Frequency Stability	±0.5 PPM or better		User/ DCPW to test
1.5	Channel Spacing	12.5 KHz		User/ DCPW to test
1.6	Emission	Analog - 11K0F3E Digital - 7K60FXE & 7K60FXD / 7K60FXW		User/ DCPW to test
1.7	Power Supply	230 V ± 10%, 50 Hz		User/ DCPW to test
1.8	Vocoder	AMBE+2		User/ DCPW to test
2	TRANSMITTER	1 to 50W Or 50 to 100 W (User Selectable)		
2.1	Power	User/ DCPW to test		
2.2	FM Hum & Noise	-40 dB or better		User/ DCPW to test
2.3	Adjacent channel power	-60 dBc or better		User/ DCPW to test
2.4	Audio Response	+1, -3dB		User/ DCPW to test
2.5	Modulation	4FSK		User/ DCPW to test
	RECEIVER			
3.1	Sensitivity (Analog)	0.30 µV at 12db SINAD or better		User/ DCPW to test
3.2	Sensitivity (Digital)	0.30µV at 5% BER or better		User/ DCPW to test
3.3	Inter-modulation rejection	70dB or better		OEM Certification supported by International Recognised Laboratory
3.4	Adjacent Channel Selectivity	≥ 65dB @ 12.5 KHz		User/ DCPW to test
4	Antenna System			
4.1	Separate antenna system for Tx and Rx which shall include High Gain antenna system	User/ DCPW to test		

DMR Radio

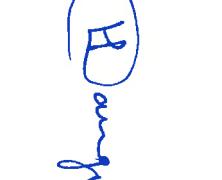
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	Minimum 10dBi or better for Tx (1+1) and Rx.	User/ DCPW to test
4.2	Surge protecting devices in RF cables	
5 CHANNEL UNIT:		User/ DCPW to test
5.1	Shall be Modular/Expandable.	User/ DCPW to test
5.2	Each channel should be configurable to traffic and control unit and vice-versa.	OEM Certification supported by International Recognised Laboratory
6 AIR INTERFACE STANDARDS:	Shall be open Standards DMR Tier-III	OEM Certification supported by International Recognised Laboratory
7 BASE STATION to BASE STATION AND MASTER STATION CONTROL INTERFACE :	For inter cell traffic communication with microwave, optical fibre or PSTN Leased line independently.	User/ DCPW to test
8 ENVIRONMENTAL		OEM Certification supported by International Recognised Laboratory
8.1 Operating Temperature	-30°Cto+55°C	
8.2 Storage Temperature	-40°Cto+70°C	
8.3 Humidity	95% Max. at +40°C non-condensing	

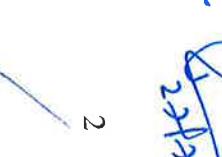
DMR Radio











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2. QRS of RADIO TRUNKING SYSTEM - DMR Technology, Tier-III

B. MASTER CONTROL UNIT :

ESSENTIAL FEATURES:

S.I. No.	SPECIFICATIONS	Trial Directives
1	Switching System	User/ DCPW to test
1.1	IP based switching equipment.	User/ DCPW to test
1.2	Shall be equipped with all necessary sub systems/ modules and one time licensed system software as required for whole life.	User/ DCPW to test
1.3	High availability failover mechanism to switch from primary to secondary switch/controller and vice-versa for hardware failure, software failure and network failure.	User/ DCPW to test
1.4	Data base shall be mirrored in both the site hot standby.	User/ DCPW to test
2	Minimum No. of Base Station supported - 10 nos.	User/ DCPW to test
3	Minimum No. of Carriers Station sites supported – 06 nos.	User/ DCPW to test
4	Network should support at least 250 Carriers	User/ DCPW to test
5	Minimum Radio terminal supported- 2000 which will include mobile/static/portable radio dispatchers and gateway etc.	User/ DCPW to test
6	Minimum No. of talk groups - 50	User/ DCPW to test
7	Dispatch Console: Minimum 2 Nos. Or more as per user requirement	User/ DCPW to test
7.1	The Dispatcher Console shall be able to handle:	User/ DCPW to test
	a) Individual calls, group calls, all calls, broadcast calls, emergency calls and patched group calls.	
	b) Data services like status, SDS and free form text messaging	
	c) Repeater site wise Tracking of Radio subscribers.	
	d) Calls shall be initiated by selecting talk-group(s) from the graphical display	
	e) The Dispatch console shall have Radio enable and disable/Stunun-stun facility.	
	f) The Dispatch console shall maintain call and activity log for audit.	
	f) No call failure	

DMR Radio

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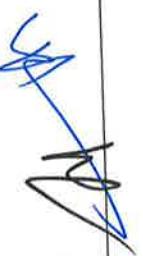
8	Network Management Terminal (NMT)	User/ DCPW to test
8.1	<ul style="list-style-type: none"> a) NMT shall work in closed captive Network environment and should have hot standby redundancy. b) NMT shall be equipped with all necessary sub-systems/ modules and installed with necessary licensed software. c) The NMT shall provide map of the equipment in the network, such as switch controllers, radio base stations, servers and work stations etc. in Trunked Radio System with status and alarm indication. d) NMT should display real time channel activity and store activity/ logging of system components. e) The NMT shall provide user friendly GUI to the NMS administrator and operators with pull-down menu, function keys, online help screens, windows, color pictures and statistical graphs for easy operation and interpretation of information. f) The call processing shall not affected by failure of network management system/ terminal. 	
8.2	Fault management: To monitor and to display the status and status history of a system component and should also perform diagnostics when needed	User/ DCPW to test
8.3	<p>Voice Call Type: Group call, individual calls, emergency calls, Broadcast calls.</p> <p>Non Voice calls / data calls:</p> <ul style="list-style-type: none"> a) Inhibit / Uninhibit b) Authentication registration c) Location information transfer d) Status, short data messages e) Packet data transfer facility for customized application f) Shall support AVLS 	User/DCPW to test
8.3	Scanning: Shall support talk group scan, priority scan	User/ DCPW to test
8.4	Late Entry: Shall support to Group calls.	User/ DCPW to test
8.5	<p>Fault Tolerance:</p> <ul style="list-style-type: none"> a) In case of failure in network, isolated site shall be switched to single site Trunking mode at that time. b) In case of Base Station failure, the user terminals should operate in Fail Soft Mode. 	User/ DCPW to test

DMR Radio

A series of handwritten signatures and initials in blue ink, including 'JMK', 'M', '27/7/17', 'H angry', and a large stylized signature at the bottom right.

	Subscriber Management Features: Add/remove subscribers	User/ DCPW to test
8.6	<ul style="list-style-type: none"> a) Add/remove multiple subscribers b) Customize call type permissions c) Add/remove multiple talk groups d) Add a broadcast call group e) Add a system call group 	User/ DCPW to test
8.7	<p>System Management Features:</p> <ul style="list-style-type: none"> a) Transmission Trunking b) Subscriber unit registration/ de-registration c) Group call with late entry, talk group ID d) Broadcast group call, Unit-to-unit call e) Call queuing f) Status message, short message g) Priority talk group monitor and override h) Radio check, radio inhibit/sun-inhibit i) Roaming j) Group location restrictions k) Subscriber location / restrictions 	User/ DCPW to test
8.8	Maintenance: license for OS, application, recovery software and database backup features.	User/ DCPW to test
9	Remote Killing: Provision to kill or disable the Radio remotely.	User/ DCPW to test
10	Accounting management: The accounting management feature shall have the capability of tracking the activity of radio users on the system and allow the customer to produce reports about the traffic on the system.	User/ DCPW to test
11	Performance management: The performance feature shall have the capability to monitor, control and optimize the utilization of system resources.	User/ DCPW to test
12	<p>Security management:</p> <ul style="list-style-type: none"> a) System should support multiple number of network management user accounts. b) Access rights to the various network management applications. c) Multiple levels of access rights to users for performing tasks with these applications. <p>The security management feature shall have the capability of allowing the establishment of authorized log-on names and passwords to the NMS.</p>	User/ DCPW to test

DMR Radio







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OPTIONAL FEATURE :-

10	Voice Recording System:	
10.1	<p>The Voice Recording System shall support:</p> <ul style="list-style-type: none"> a) Minimum 16 Nos. of Channel and should be modularly expandable as per the user requirement b) Group call within subscriber radios c) Calls to and from Dispatch console and subscriber radios. d) Individual call recording with facility to disable this feature. e) Telephone call through telephone gateway f) Calls through conventional analog FM gateway with its metadata, ie Date, time, duration, PTT ID, Group ID, etc g) Provision to search records, replay the voice conversations, back-up and restore facility should to be built-in-suitable GUI, application shall be provided. h) Calls can be located and replay by radio I/D, talk group, I/D, Alias, date/ Time criteria etc i) Digital call recorder shall support Encryption. j) Data should be recorded in main site and other (fall back/Disaster recovery) site recorder simultaneously. k) The system should have minimum 100 TB of storage capacity and should be modularly expandable 	User/ DCPW to test
11	<p>AVLS : GIS INTERFACE FOR CALL-TAKING AND DISPATCHING</p> <p>The AVLS System should be capable of providing the following basic features:</p>	User/ DCPW to test
11.1	Shall be capable of displaying a map with the geo-code at the centre of the map display window and at a predefined scale based on a predefined display screen rules.	User/ DCPW to test
11.2	Shall be capable of locating and displaying geographical information using defined attribute type	User/ DCPW to test
11.3	<p>Map Query: Shall undertakes a number of queries based upon specific map features to determine:</p> <ul style="list-style-type: none"> a. Street/road and cross-street/road names. b. Co-ordinate positions. c. Address ranges. d. Database information associated with a graphic symbol. 	User/ DCPW to test
11.4	Map Grid: Shall be capable of continuously reporting one or more of the following grid references (to the Dispatcher's screen) as the Dispatcher moves the cursor: Latitude and longitude.	User/ DCPW to test

DMR Radio

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1	Resource symbols shall be able to be automatically placed on the map display at the location as reported from Automatic Vehicle Location. For the continuous streaming of coordinates, the system shall be able to continuously update the vehicle symbol as the coordinates are received from the Automatic Vehicle Location (AVL).	User/ DCPW to test
11.6	The incident and resource symbols should be able to be colour coded and have that colour automatically updated as the status-changes.	User/ DCPW to test
12	Health Status: Health Status of Remote radio should be available in NMS.	User/ DCPW to test





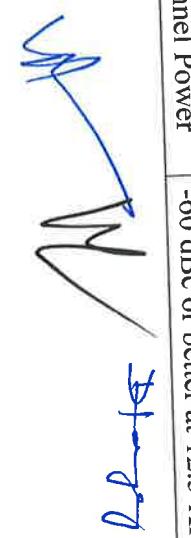


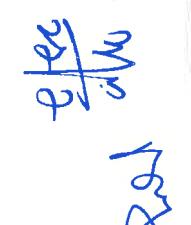
ORS of RADIO TRUNKING SYSTEM - DMR Technology, Tier-III

C. DIGITAL HANDHELD RADIO :

S.I. No.	SPECIFICATIONS	Trial Directives
1	GENERAL	
1.1	Frequency Range	400 MHz Band OR 800 MHz Band
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band
1.3	TDMA	2 – Slot
1.4	Operation Modes	DMR Tier III
1.7	Emission	11K0F3E, 7K60FXE, 7K60FXD, 7K60FXW
1.5	Number of Channel	1000 or better
1.6	Channel Spacing	12.5 kHz
1.7	Number of contacts (individual / group call numbers)	1000 or better
1.8	Battery Capacity	Li-ion/Li-Poly rechargeable battery of capacity 2000 mAh or higher
1.9	Frequency Stability	±1.5 PPM or better
1.10	Display	Alphanumeric
1.11	VSWR	Better than 1.5
1.12	Protection	Reverse Polarity and High VSWR
1.13	Interoperability with minimum two vendors	IOP Certification from Technical Working Group (TWG) of the DMR Association.
2	TRANSMITTER	
2.1	RF Power Output	4W for 400 MHz (programmable) 3W for 800 MHz Band (programmable)
2.2	Digital Modulation	4FSK DMR TIER-III
2.3	Modulation Deviation	±2.5 kHz at 12.5 kHz
2.4	FM Hum & Noise	-40 dB or better at 12.5 kHz
2.5	Adjacent Channel Power	-60 dBc or better at 12.5 kHz

DMR Radio






2.	Audio Response	+1,-3dB	User/ DCPW to test
2.7	Digital Vocoder	AMBE +2	User/ DCPW to test
3	RECEIVER		User/ DCPW to test
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD) or better	User/ DCPW to test
3.2	Sensitivity (digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Adjacent Channel Selectivity	60dB or better at 12.5 KHz	OEM Certification supported by International Recognised Laboratory
3.4	Inter-modulation	70dB or better	User/ DCPW to test
3.5	Audio Output	Minimum 500m W	User/ DCPW to test
3.6	Audio Distortion	Less than 3 %	User/ DCPW to test
4	GPS		User/ DCPW to test
4.1	Time to first fix cold Start	<2 Minutes	User/ DCPW to test
4.2	Time to first fix hot Start	< 20 Second	User/ DCPW to test
4.3	Horizontal accuracy	< 10 Meter	User/ DCPW to test
5	ENVIRONMENTAL		OEM Certification supported by International Recognised Laboratory
5.1	Operating Temperature	-30°Cto+55°C	
5.2	Storage Temperature	-40°Cto+70°C	
5.3	Humidity	95% Max. at +40°C non-condensing	
5.4	Vibration	MIL-STD -810 F/G	
5.5	Shock & Drop	MIL-STD -810 F/G	
5.6	Water intrusion & Dust	MIL-STD -810 F/G & IP-67	
5.7	Salt	MIL-STD -810 F/G	
5.8	Rain	MIL-STD -810 F/G	
5.9	Low Pressure	MIL-STD -810 F/G	

A) ACCESSORIES	
Battery Charger	230V \pm 10%, 50 Hz
Input Voltage	As per battery pack (Information will be provided by OEM / Vendor)
Output Voltage	Li-Ion / Li-poly
Type of Battery	
Charger Protection	<ul style="list-style-type: none"> 1. Reverse Polarity Protection 2. Short Circuit Protection
Indication	Visual Indication for all modes of charging status
Charging Time	<ul style="list-style-type: none"> Standard Charger – 6 to 14 hrs Rapid Charger – 1 to 3 hrs
No. of charging pockets	1 / 2 / 6 (Vendor to quote accordingly)
Hands free Kit (VOX unit with PTT) (Optional)	<p>The offered sets should be compatible with minimum any of the two or more variants</p> <ul style="list-style-type: none"> 1. Bone Conduction 2. Ear Plug 3. Headphone, etc
Programming Kit	All necessary Software and Hardware required for programming of the set independently for lifelong support with regular updates.
Leather Case	One good quality leather case with belt clip and shoulder strap.
No. of Battery	Two Li-ion or Li-poly batteries with each radio sets.
Literature	<ul style="list-style-type: none"> a) User manual with each radio sets should be provided free of cost in soft as well as hard copy. b) Technical repairing manual, with complete block diagram, circuit layout, PCB layout, component & wiring diagram etc should be provided as per user's requirement in soft as well as hard copy.

2. QRS of RADIO TRUNKING SYSTEM - DMR Technology, Tier-III

D. DIGITAL MOBILE RADIO :

S.I. No.	SPECIFICATIONS			Trial Directives
1	GENERAL	400 MHz Band	OR	800 MHz Band
1.1	Frequency Range	10 MHz for 400 MHz Band		User/ DCPW to test
1.2	Duplex Spacing	45 MHz for 800 MHz Band		User/ DCPW to test
1.3	TDMA	2 – Slot		User/ DCPW to test
1.4	Operation Modes	DMR Tier III		User/ DCPW to test
1.7	Emission	11K0F3E, 7K60FXE , 7K60FXD, 7K60FXW		User/ DCPW to test
1.5	Number of Channel	1000 or better		User/ DCPW to test
1.6	Channel Spacing	12.5 kHz		User/ DCPW to test
1.7	Number of contacts (individual / group call numbers)	1000 or better		User/ DCPW to test
1.8	Operating Voltage	11.25 VDC		User/ DCPW to test
1.9	Frequency Stability	±1.5 PPM or better		User/ DCPW to test
1.10	Display	Alphanumeric		User/ DCPW to test
1.11	VSWR	Better than 1.5		User/ DCPW to test
1.12	Protection	Reverse Polarity and High VSWR		User/ DCPW to test
1.13	Interoperability with minimum two vendors	IOP Certification from Technical Working Group (TWG) of the DMR Association		User/ DCPW to test
2	TRANSMITTER	Minimum 25 W for all bands		User/ DCPW to test
2.1	RF Power Output	4FSK DMR TIER-III		User/ DCPW to test
2.2	Digital Modulation	±2.5 kHz at 12.5 kHz		User/ DCPW to test
2.3	Modulation Deviation	-40 dB or better at 12.5 KHz		User/ DCPW to test
2.4	FM Hum & Noise	-60 dBc or better at 12.5 KHz		User/ DCPW to test
2.5	Adjacent Channel Power	+1,-3dB		User/ DCPW to test
2.6	Audio Response			

2.7	Digital Vocoder	AMBE +2	User/ DCPW to test
3	RECEIVER		
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD)or better	User/ DCPW to test
3.2	Sensitivity (digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Adjacent Chanel Selectivity	60dB or better at 12.5 KHz	OEM Certification supported by International Recognised Laboratory
3.4	Inter-modulation	70dB or better	User/ DCPW to test
3.5	Audio Output	Minimum 3 W	User/ DCPW to test
3.6	Audio Distortion	Less than 3 %	User/ DCPW to test
4	GPS		
4.1	Time to first fix cold Start	<2 Minutes	User/ DCPW to test
4.2	Time to first fix hot Start	<20 Second	User/ DCPW to test
4.3	Horizontal accuracy	< 10 Meter	User/ DCPW to test
5	ENVIRONMENTAL		
5.1	Operating Temperature	-30°Cto+55°C	OEM Certification supported by International Recognised Laboratory
5.2	Storage Temperature	-40°Cto+70°C	
5.3	Humidity	95% Max. at +40° C non-condensing	
5.4	Vibration	MIL-STD -810 F/G	
5.5	Shock & Drop	MIL-STD -810 F/G	
5.6	Water intrusion & Dust	MIL-STD -810 F/G & IP54	
5.7	Salt	MIL-STD -810 F/G	
5.8	Rain	MIL-STD -810 F/G	
5.9	Low Pressure	MIL-STD -810 F/G	

Note:- 1. The Technical Specifications & Trial Directives may be used for procurement as per the applicable GFR or State Financial Rules.

Technical Specifications may slightly be modified by user organisations for specific requirement, if any, with the approval of competent authority.

authority.

2. User Organisations may ask the vendors for lifetime support for supplied Software updates / patches , Warranty and Spare support as per the need.

3. If required, submitted OEM Certificates results may be verified from the available certified laboratories.

(Prem Dangri)
Deputy Superintendent of
Police,
Haryana Police

(Amar Singh Meena)
Assistant Commissioner of
Police,
Delhi Police

(Rajesh Ekka)
Deputy Director,
DCPW

(D. Mukhopadhyay)
Joint Director,
DCPW

(N S J Lakshmi)
Deputy Inspector General,
Andhra Pradesh Police

(P K Jha)
Deputy Commandant,
CRPF

(R K Verma)
Deputy Director,
DCPW

(Balkrishna Yadav)
Deputy Commissioner of Police ,
Mumbai Police

(Devendra Singh)
Additional Director,
DCPW

ORS of RADIO TRUNKING SYSTEM – APCO PHASE-II Technology

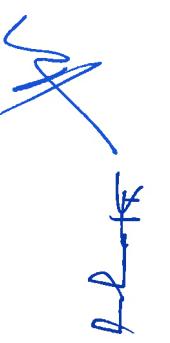
A. BASE STATION UNIT (BSU) :

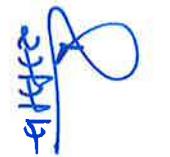
SPECIFICATIONS		Trial Directives	
SI.No.	GENERAL		
1.1	Frequency Range	400 MHz Band	OR 800 MHz Band
1.2	Duplex Spacing	10 MHz for 400 MHz Band	User/ DCPW to test
		45 MHz for 800 MHz Band	User/ DCPW to test
1.3	Technology	TDMA - two slot APCO P25 Phase-II	User/ DCPW to test
1.4	Frequency Stability	±0.5 PPM or better	User/ DCPW to test
1.5	Channel Spacing	12.5 KHz	User/ DCPW to test
1.6	Emission	9K80D7W	User/ DCPW to test
1.7	Power Supply	230 V ± 10% 50 Hz	User/ DCPW to test
1.8	Vocoder	AMBE+2 (Dual Rate)	User/ DCPW to test
TRANSMITTER			
2.1	Power	1 to 50 W Or 50 to 100 W (User Selectable)	User/ DCPW to test
2.2	FM Hum & Noise	-40 dB or better	User/ DCPW to test
2.3	Adjacent channel power	-60 dBc or better	User/ DCPW to test
2.4	Audio Response	+1, -3dB	User/ DCPW to test
2.5	Modulation	Inbound : HCPM (TDMA) Outbound : HDQPSK (TDMA)	User/ DCPW to test
RECEIVER			
3.1	Sensitivity (Analog)	0.30 µV at 12db SINAD or better	User/ DCPW to test
3.2	Sensitivity (Digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Inter-modulation rejection	70dB or better	OEM Certification supported by International Recognised Laboratory
3.4	Adjacent Channel Selectivity	≥ 65dB @ 12.5 KHz	User/ DCPW to test
4	Antenna System		

APCO-II Radios

4.1	Separate antenna system for Tx and Rx which shall include High Gain antenna system Minimum 10dBi or better for Tx (1+1) and Rx. .	User/ DCPW to test
4.2	Surge protecting devices in RF cables	User/ DCPW to test
5 CHANNEL UNIT:		
5.1	Shall be Modular/Expandable.	User/ DCPW to test
5.2	Each channel should be configurable to traffic and control unit and vice-versa.	User/ DCPW to test
6 AIR INTERFACE STANDARDS:	Shall be open Standards APCO P25 Phase-II	OEM Certification supported by International Recognised Laboratory
7 BASE STATION to BASE STATION AND MASTER STATION CONTROL INTERFACE:	For inter cell traffic communication with microwave, optical fibre or PSTN Leased line independently.	User/ DCPW to test
8 ENVIRONMENTAL		
8.1	Operating Temperature	-30°Cto+55°C
8.2	Storage Temperature	-40°Cto+70°C
8.3	Humidity	95% Max. at +40° C non-condensing

APCO-II Radios








QRS of RADIO TRUNKING SYSTEM – APCO PHASE-II Technology

B. MASTER CONTROL UNIT :

ESSENTIAL FEATURES:

S.I. No.	SPECIFICATIONS	Trial Directives
1	Switching System	
1.1	IP based switching equipment.	User/ DCPW to test
1.2	Shall be equipped with all necessary sub systems/ modules and one time licensed system software as required for whole life.	User/ DCPW to test
1.3	High availability failover mechanism to switch from primary to secondary switch/controller and vice-versa for hardware failure, software failure and network failure.	User/ DCPW to test
1.4	Data base shall be mirrored in both the hot standby.	User/ DCPW to test
2	Minimum No. of Base Station supported - 10 nos.	User/ DCPW to test
3	Minimum No. of Carriers Station sites supported – 06 nos.	User/ DCPW to test
4	Network should support at least 250 Carriers	User/ DCPW to test
5	Minimum Radio terminal supported-- 2000 which will include mobile/static/portable radio dispatchers and gateway etc	User/ DCPW to test
6	Minimum No. of talk groups – 50	User/ DCPW to test
7	Dispatcher Console: Minimum 2 Nos. Or more as per user requirement	User/ DCPW to test
7.1	The Dispatcher Console shall be able to handle:	
a)	Individual calls, group calls, all calls, broadcast calls, emergency calls and patched group calls.	User/ DCPW to test
b)	Data services like status, SDS and free form text messaging	
c)	Repeater site wise Tracking of Radio subscribers.	
d)	Calls shall be initiated by selecting talk-group(s) from the graphical display	
e)	The Dispatch console shall have Radio enable and disable/Stunun-stun facility.	
f)	The Dispatch console shall maintain call and activity log for audit.	
	No call failure	

APCO-II Radios

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8	Network Management Terminal (NMT)	User/ DCPW to test
8.1	<p>NMT shall work in closed captive Network environment and should have hot standby redundancy.</p> <ul style="list-style-type: none"> a) NMT shall be equipped with all necessary sub-systems/ modules and installed with necessary licensed software. b) The NMT shall provide map of the equipment in the network, such as switch controllers, radio base stations, servers and work stations etc. in Trunked Radio System with status and alarm indication. c) NMT should display real time channel activity and store activity logging of system components. d) The NMT shall provide user friendly GUI to the NMS administrator and operators with pull-down menu, function keys, online help screens, windows, color pictures and statistical graphs for easy operation and interpretation of information. e) The call processing shall not affected by failure of network management system/ terminal. f) Fault management: To monitor and to display the status and status history of a system component and should also perform diagnostics when needed 	User/ DCPW to test
8.2		User/ DCPW to test
8.3	<p>Voice Call Type: Group call, individual calls, emergency calls, Broadcast calls.</p> <p>Non Voice calls / data calls:</p> <ul style="list-style-type: none"> a) Inhibit / uninhibit b) Authentication registration c) Location information transfer d) Status, short data messages e) Packet data transfer facility for customized application f) Shall support AVLs 	User/ DCPW to test
8.4	Scanning: Shall support talk group scan, priority scan	User/ DCPW to test
8.5	<p>Fault Tolerance:</p> <ul style="list-style-type: none"> a) In case of failure in network, isolated site shall be switched to single site Trunking mode at that time b) In case of Base Station failure, the user terminals should operate in Fail Soft Mode. 	User/ DCPW to test

	Subscriber Management Features: Add/remove subscribers	User/ DCPW to test
8.6	a) Add/remove multiple subscribers b) Customize call type permissions c) Add/remove multiple talk groups d) Add a broadcast call group e) Add a system call group	User/ DCPW to test
8.7	System Management Features: a) Transmission Trunking b) Subscriber unit registration/ de-registration c) Group call with late entry, talk group ID d) Broadcast group call, Unit-to-unit call e) Call queuing f) Status message, short message g) Priority talk group monitor and override h) Radio check, radio inhibit/sun-inhibit i) Roaming j) Group location restrictions k) Subscriber location / restrictions	User/ DCPW to test
8.8	Maintenance: license for OS, application, recovery software and database backup features.	User/ DCPW to test
9	Remote Killing: Provision to kill or disable the Radio remotely.	User/ DCPW to test
10	Accounting management: The accounting management feature shall have the capability of tracking the activity of radio users on the system and allow the customer to produce reports about the traffic on the system.	User/ DCPW to test
11	Performance management: The performance feature shall have the capability to monitor, control and optimize the utilization of system resources.	User/ DCPW to test
12	Security management: a) System should support multiple number of network management user accounts. b) Access rights to the various network management applications. c) Multiple levels of access rights to users for performing tasks with these applications. The security management feature shall have the capability of allowing the establishment of authorized log-on names and passwords to the NMS.	User/ DCPW to test

APCO-II Radios

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W/ 2021b
Mr. Hart
2/27/2021
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OPTIONAL FEATURES:

		Trial Directives
10	Voice Recording System:	User/ DCPW to test
10.1	<p>The Voice Recording System shall support:</p> <p>a) Minimum 16 Nos. of Channel and should be modularly expandable as per the user requirement</p> <ul style="list-style-type: none"> b) Group call within subscriber radios c) Calls to and from Dispatch console and subscriber radios. d) Individual call recording with facility to disable this feature. e) Telephone call through telephone gateway f) Calls through conventional analog FM gateway with its metadata, ie Date, time, duration, PTT ID, Group ID, etc g) Provision to search records, replay the voice conversations, back-up and restore facility should to be built-in-suitable GUI, application shall be provided. h) Calls can be located and replay by radio I/D, talk group, I/D, Alias, date/ Time criteria etc i) Digital call recorder shall support Encryption. j) Data should be recorded in main site and other (fall back/Disaster recovery) site recorder simultaneously. k) The system should have minimum 100 TB of storage capacity and should be modularly expandable 	
11	AVLS : GIS INTERFACE FOR CALL-TAKING AND DISPATCHING The AVLS System should be capable of providing the following basic features:	User/ DCPW to test
11.1	Shall be capable of displaying a map with the geo-code at the centre of the map display window and at a predefined scale based on a predefined display screen rules.	User/ DCPW to test
11.2	Shall be capable of locating and displaying geographical information using defined attribute type	User/ DCPW to test
11.3	<p>Map Query: Shall undertake a number of queries based upon specific map features to determine:</p> <ul style="list-style-type: none"> a. Street/road and cross-street/road names. b. Co-ordinate positions. c. Address ranges. d. Database information associated with a graphic symbol. 	User/ DCPW to test
11.4	Map Grid: Shall be capable of continuously reporting one or more of the following grid references (to the Dispatcher's screen) as the Dispatcher moves the cursor: Latitude and longitude.	User/ DCPW to test
11.5	Resource symbols shall be able to be automatically placed on the map display at the location as reported from Automatic Vehicle Location. For the continuous streaming of coordinates, the system shall be able to continuously update the vehicle symbol as the coordinates are received	User/ DCPW to test

APCO-II Radios

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	from the Automatic Vehicle Location (AVL).	
11.6	The incident and resource symbols should be able to be colour coded and have that colour automatically updated as the status-changes.	User/DCPW to test
12	Health Status: Health Status of Remote radio should be available in NMS.	User/DCPW to test

QRs of RADIO TRUNKING SYSTEM – APCO PHASE-II Technology

C. DIGITAL HANDHELD RADIO :

S.I. No.	SPECIFICATIONS	400 MHz Band	OR	800 MHz Band	Trial Directives
1	GENERAL				User/ DCPW to test
1.1	Frequency Range	400 MHz Band	OR	800 MHz Band	User/ DCPW to test
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band			User/ DCPW to test
1.3	TDMA	2 – Slot			User/ DCPW to test
1.4	Operation Modes	APCO P25 Phase II			User/ DCPW to test
1.5	Emission	9K80D7W.			User/ DCPW to test
1.6	Number of Channel	1000 or better			User/ DCPW to test
1.7	Channel Spacing	12.5 kHz			User/ DCPW to test
1.8	Number of contacts (individual / group call numbers)	1000 or better			User/ DCPW to test
1.9	Battery Capacity	Li-ion/Li-Poly rechargeable battery of capacity 2000 mAh or higher			User/ DCPW to test
1.10	Frequency Stability	Bidder to specify the specific voltage capacity.			User/ DCPW to test
1.11	Display	±1.5 PPM or better			User/ DCPW to test
1.12	VSWR	Alphanumeric			User/ DCPW to test
1.13	Protection	Better than 1.5			User/ DCPW to test
1.14	Interoperability with minimum two vendors	Reverse Polarity and High VSWR			User/ DCPW to test
2	TRANSMITTER	IOP Certification from Technical Working Group (TWG) of the APCO Association			User/ DCPW to test
2.1	RF Power Output	4W for 400 MHz Band (programmable) 3W for 800 MHz Band (programmable)			User/ DCPW to test
2.2	Digital Modulation	Inbound : HCPM (TDMA) Outbound : HDQPSK (TDMA)			User/ DCPW to test
2.3	FM Hum & Noise	-40 dB or better at 12.5 KHz			User/ DCPW to test
2.4	Adjacent Channel Power	-60 dBc or better at 12.5 KHz			User/ DCPW to test

APCO-II Radios

2.5	Audio Response	+1,-3dB	User/ DCPW to test
2.6	Digital Vocoder	AMBE +2 (Dual Rate)	User/ DCPW to test
3	RECEIVER		
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD) or better	User/ DCPW to test
3.2	Sensitivity (digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Adjacent Chanel Selectivity	60dB or better at 12.5 KHz	User/ DCPW to test
3.4	Inter-modulation	70dB or better	OEM Certification supported by International Recognised Laboratory
3.5	Audio Output	Minimum 500m W	User/ DCPW to test
3.6	Audio Distortion	Less than 3%	User/ DCPW to test
4	GPS		
4.1	Time to first fix cold Start	<2 Minutes	User/ DCPW to test
4.2	Time to first fix hot Start	< 20 Second	User/ DCPW to test
4.3	Horizontal accuracy	< 10 Meter	User/ DCPW to test
5	ENVIRONMENTAL		
5.1	Operating Temperature	-30°Cto+55°C	OEM Certification supported by International Recognised Laboratory
5.2	Storage Temperature	-40°Cto+70°C	
5.3	Humidity	95% Max. at +20° C non-condensing	
5.4	Vibration	MIL-STD -810 F/G	
5.5	Shock & Drop	MIL-STD -810 F/G	
5.6	Water intrusion & Dust	MIL-STD -810 F/G & IP-67	
5.7	Salt	MIL-STD -810 F/G	
5.8	Rain	MIL-STD -810 F/G	
5.9	Low Pressure	MIL-STD -810 F/G	

APCO-II Radios

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ACCESSORIES	
Battery Charger	230V \pm 10%, 50 Hz
Input Voltage	As per battery pack (Information will be provided by OEM / Vendor)
Output Voltage	Li-Ion / Li-poly
Type of Battery Charger	<ul style="list-style-type: none"> 1. Reverse Polarity Protection 2. Short Circuit Protection
Protection	Visual Indication for all modes of charging status
Indication	<ul style="list-style-type: none"> 1. Standard Charger – 6 to 14 hrs 2. Rapid Charger – 1 to 3 hrs
Charging Time	1 / 2 / 6 (Vendor to quote accordingly)
No. of charging pockets	The offered sets should be compatible with minimum any of the two or more variants
Hands free Kit (VOX unit with PTT)(Optional)	<ul style="list-style-type: none"> 1. Bone Conduction 2. Ear Plug 3. Headphone, etc
Programming Kit	All necessary Software and Hardware required for programming of the set independently for lifelong support with regular updates.
Leather Case	One good quality leather case with belt clip and shoulder strap.
No. of Battery	Two Li-ion or Li-poly batteries with each radio sets.
Literature	<ul style="list-style-type: none"> a) User manual with each radio sets should be provided free of cost in soft as well as hard copy. b) Technical repairing manual, with complete block diagram, circuit layout, PCB layout, component & wiring diagram etc should be provided as per user's requirement in soft as well as hard copy.

ORs of RADIO TRUNKING SYSTEM – APCO PHASE-II Technology

D. DIGITAL MOBILE RADIO :

S.I. No.	SPECIFICATIONS	Trial Directives
1 GENERAL		
1.1 Frequency Range	400 MHz Band OR 800 MHz Band	User/DCPW to test
1.2 Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band	User/DCPW to test
1.3 TDMA	2 – Slot	User/DCPW to test
1.4 Operation Modes	APCO P25 Phase II	User/DCPW to test
1.7 Emission	9K80D7W	User/DCPW to test
1.5 Number of Channel	1000 or better	User/DCPW to test
1.6 Channel Spacing	12.5 kHz	User/DCPW to test
1.7 Number of contacts (individual / group call numbers)	1000 or better	User/DCPW to test
1.8 Operating Voltage	11.25 VDC	User/DCPW to test
1.9 Frequency Stability	±1.5 PPM or better	User/DCPW to test
1.10 Display	Alphanumeric	User/DCPW to test
1.11 VSWR	Better than 1.5	User/DCPW to test
1.12 Protection	Reverse Polarity and High VSWR	User/DCPW to test
1.13 Interoperability with minimum two vendors	IOP Certification from Technical Working Group (TWG) of the APCO Association	User/DCPW to test
2 TRANSMITTER		
2.1 RF Power Output	Minimum 25 W for all bands	User/DCPW to test
2.2 Digital Modulation	Inbound : HCPM (TDMA) Outbound : HDQPSK (TDMA)	User/DCPW to test
2.3 FM Hum & Noise	-40 dB or better at 12.5 KHz	User/DCPW to test
2.4 Adjacent Channel Power	-60 dBc or better at 12.5 KHz	User/DCPW to test
2.5 Audio Response	+1,-3dB	User/DCPW to test
2.6 Digital Vocoder	AMBE +2 (Dual Rate)	User/DCPW to test

APCO-II Radios

3	RECEIVER		
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD)or better	User/ DCPW to test
3.2	Sensitivity (Digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Adjacent Channel Selectivity	60dB or better at 12.5 KHz	User/ DCPW to test
3.4	Inter-modulation	70dB or better	OEM Certification supported by International Recognised Laboratory
3.5	Audio Output	Minimum 3 W	User/ DCPW to test
3.6	Audio Distortion	Less than 3%	User/ DCPW to test
4	GPS		
4.1	Time to first fix cold Start	<2 Minutes	User/ DCPW to test
4.2	Time to first fix hot Start	< 20 Second	User/ DCPW to test
4.3	Horizontal accuracy	< 10 Meter	User/ DCPW to test
5	ENVIRONMENTAL		
5.1	Operating Temperature	-30°Cto+55°C	OEM Certification supported by International Recognised Laboratory
5.2	Storage Temperature	-40°Cto+70°C	
5.3	Humidity	95% Max. at +20° C non-condensing	
5.4	Vibration	MIL-STD -810 F/G	
5.5	Shock & Drop	MIL-STD -810 F/G	
5.6	Water intrusion & Dust	MIL-STD -810 F/G & IP-54	
5.7	Salt	MIL-STD -810 F/G	
5.8	Rain	MIL-STD -810 F/G	
5.9	Low Pressure	MIL-STD -810 F/G	

Note:-
1. The Technical Specifications & Trial Directives may be used for procurement as per the applicable GFR or State Financial Rules.

Technical Specifications may slightly be modified by user organisations for specific requirement, if any, with the approval of competent authority.

APCO-II Radios

2. User Organisations may ask the vendors for lifetime support for supplied Software updates / patches , Warranty and Spare support as per the need.

3. If required, submitted OEM Certificates results may be verified from the available certified laboratories.


(Prem Dangji)

Deputy Superintendent of Police,
Haryana Police


(R K Verma)

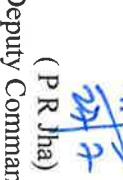
Deputy Director,
DCPW


(Amar Singh Meena)

Assistant Commissioner of Police,
Delhi Police


(Rajesh Ekkad)

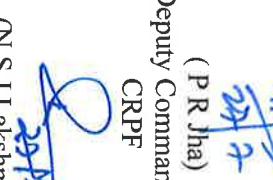
Deputy Director,
DCPW


(P R Jha)

Deputy Commandant,
CRPF


(D. Mukhopadhyay)

Joint Director,
DCPW


(N S J Lakshmi)

Deputy Inspector General,
Andhra Pradesh Police


(Balkrishna Yadav)

Deputy Commissioner of Police,
Mumbai Police


(Devendra Singh)

Additional Director,
DCPW

ORs of RADIO TRUNKING SYSTEM – TETRA Technology

A. BASE STATION UNIT (BSU):

SPECIFICATIONS		TRIAL DIRECTIVES	
S.I. No.	GENERAL		
1.1	Frequency Range	400 MHz Band OR 800 MHz Band	User/ DCPW to test
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band	User/ DCPW to test
1.3	Technology	TDMA- 4 slot TETRA Standard	User/ DCPW to test
1.4	Frequency Stability	± 0.5 PPM or better	User/ DCPW to test
1.5	Channel Spacing	25 KHz	User/ DCPW to test
1.6	Emission	21K0D1W	User/ DCPW to test
1.7	Power Supply	230 V $\pm 10\%$ 50 Hz	User/ DCPW to test
1.8	Vocoder	ACELP	User/ DCPW to test
2	TRANSMITTER	1 to 50W Or 50 to 100 W (User Selectable)	User/ DCPW to test
2.1	Power	-40 dB or better	User/ DCPW to test
2.2	FM Hum & Noise	-60 dBc or better	User/ DCPW to test
2.3	Adjacent channel power	+1, -3dB	User/ DCPW to test
2.4	Audio Response	$\pi/4$ -QDPSK	User/ DCPW to test
2.5	Modulation		
3	RECEIVER		User/ DCPW to test
3.1	Sensitivity (Analog)	0.30 μ V at 12db SINAD or better	User/ DCPW to test
3.2	Sensitivity (Digital)	0.30 μ V at 5% BER or better	OEM Certification supported by International Recognised Laboratory
3.3	Inter-modulation rejection	70dB or better	User/ DCPW to test
3.4	Adjacent Channel Selectivity	≥ 65 dB @ 12.5 KHz	User/ DCPW to test
4	Antenna System	Separate antenna system for Tx and Rx which shall include High Gain antenna system Minimum 10dBi or better for Tx (1+1) and Rx..	User/ DCPW to test
4.2	Surge protecting devices in RF cables		User/ DCPW to test

TETRA Radios

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5	CHANNEL UNIT:		
5.1	Shall be Modular/Expandable.	User/ DCPW to test	
5.2	Each channel should be configurable to traffic and control unit and vice-versa.	User/ DCPW to test	
6	AIR INTERFACE STANDARDS: Shall be open Standards TETRA	OEM Certification supported by International Recognised Laboratory	
7	BASE STATION to BASE STATION AND MASTER STATION CONTROL INTERFACE: For inter cell traffic communication with microwave, optical fibre or PSTN Leased line independently.	User/ DCPW to test	
8	ENVIRONMENTAL		
8.1	Operating Temperature	-30°C to +55°C	OEM Certification supported by International Recognised Laboratory
8.2	Storage Temperature	-40°C to +70°C	
8.3	Humidity	95% Max. at +40° C non-condensing	
8.4	Vibration, Shock, Water intrusion & Dust	MIL-STD-910 F/G	

TETRA Radios

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4 ORs of RADIO TRUNKING SYSTEM – TETRA Technology

B. MASTER CONTROL UNIT :

ESSENTIAL FEATURES:

S.I.No.	SPECIFICATIONS	Trial Directives
1	Switching System	
1.1	IP based switching equipment.	User/ DCPW to test
1.2	Shall be equipped with all necessary sub systems/ modules and one time licensed system software as required for whole life.	User/ DCPW to test
1.3	High availability failover mechanism to switch from primary to secondary switch/controller and vice-versa for hardware failure, software failure and network failure.	User/ DCPW to test
1.4	Data base shall be mirrored in both the hot standby.	User/ DCPW to test
2	Minimum No. of Base Station supported - 10 nos.	User/ DCPW to test
3	Minimum No. of Carriers Station sites supported - 03 nos.	User/ DCPW to test
4	Network should support at least 125 Carriers	User/ DCPW to test
5	Minimum Radio terminal supported - 2000 which will include mobile/static/portable radio dispatchers and gateway etc	User/ DCPW to test
6	Minimum No. of talk groups – 50	User/ DCPW to test
7	Dispatcher Console: Minimum 2 Nos. Or more as per user requirement	User/ DCPW to test
7.1	The Dispatcher Console shall be able to handle:	User/ DCPW to test
	a) Individual calls, group calls, all calls, broadcast calls, emergency calls and patched group calls.	
	b) Data services like status, SDS and free form text messaging	
	c) Repeater site wise Tracking of Radio subscribers.	
	d) Calls shall be initiated by selecting talk-group(s) from the graphical display	
	e) The Dispatch console shall have Radio enable and disable/Stunun-stun facility.	
	f) No call failure	

TETRA Radios

A. Jay *M. Dany* *K. Siva*

P.S *D. Murali*

27.07.2017

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	Network Management Terminal (NMT)	
8.1	<p>a) NMT shall work in closed captive Network environment and should have hot standby redundancy</p> <p>b) NMT shall be equipped with all necessary sub-systems/ modules and installed with necessary licensed software.</p> <p>c) The NMT shall provide map of the equipment in the network, such as switch controllers, radio base stations, servers and work stations etc. in Trunked Radio System with status and alarm indication.</p> <p>d) NMT should display real time channel activity and store activity logging of system components.</p> <p>e) The NMT shall provide user friendly GUI to the NMS administrator and operators with pull-down menu, function keys, online help screens, windows, color pictures and statistical graphs for easy operation and interpretation of information.</p> <p>f) The call processing shall not be affected by failure of network management system/ terminal.</p>	User/ DCPW to test
8.2	Fault management: To monitor and to display the status and status history of a system component and should also perform diagnostics when needed	User/ DCPW to test
8.3	<p>Voice Call Type: Group call, individual calls, emergency calls, Broadcast calls.</p> <p>Non Voice calls / data calls:</p> <ul style="list-style-type: none"> a) Inhibit / Uninhibit b) Authentication registration c) Location information transfer d) Status, short data messages e) Packet data transfer facility for customized application f) Shall support AVLs <p>Scanning: Shall support talk group scan, priority scan</p>	User/ DCPW to test
8.4	Late Entry: Shall support to Group calls.	User/ DCPW to test
8.5	<p>Fault Tolerance:</p> <ul style="list-style-type: none"> a) In case of failure in network, isolated site shall be switched to single site Trunking mode at that time b) In case of Base Station failure, the user terminals should operate in Fail Soft Mode. 	User/ DCPW to test

TETRA Radios

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27.07.2017

	Subscriber Management Features: Add/remove subscribers	User/ DCPW to test
8.7	System Management Features: a) Transmission Trunking b) Subscriber unit registration/ de-registration c) Group call with late entry, talk group ID d) Broadcast group call, Unit-to-unit call e) Call queuing f) Status message, short message g) Priority talk group monitor and override h) Radio check, radio inhibit/sun-inhibit i) Roaming j) Group location restrictions k) Subscriber location / restrictions	User/ DCPW to test
8.8	Maintenance: license for OS, application, recovery software and database backup features.	User/ DCPW to test
9	Remote Killing: Provision to kill or disable the Radio remotely.	User/ DCPW to test
10	Accounting management: The accounting management feature shall have the capability of tracking the activity of radio users on the system and allow the customer to produce reports about the traffic on the system.	User/ DCPW to test
11	Performance management: The performance feature shall have the capability to monitor, control and optimize the utilization of system resources.	User/ DCPW to test
12	Security management: a) System should support multiple number of network management user accounts. b) Access rights to the various network management applications. c) Multiple levels of access rights to users for performing tasks with these applications. The security management feature shall have the capability of allowing the establishment of authorized log-on names and passwords to the NMS.	User/ DCPW to test

TETRA Radios

27.07.2017

OPTIONAL FEATURES:

10 Voice Recording System:	The Voice Recording System shall support: <ul style="list-style-type: none"> a) Minimum 16 Nos. of Channel and should be modularly expandable as per the user requirement b) Group call within subscriber radios c) Calls to and from Dispatch console and subscriber radios. d) Individual call recording with facility to disable this feature. e) Telephone call through telephone gateway f) Calls through conventional analog FM gateway with its metadata, ie Date, time, duration, PTT ID, Group ID, etc g) Provision to search records, replay the voice conversations, back-up and restore facility should to be built-in—suitable GUI, application shall be provided. h) Calls can be located and replay by radio ID, talk group, I/D, Alias, date/ Time criteria etc i) Digital call recorder shall support Encryption. j) Data should be recorded in main site and other (fall back/Disaster recovery) site recorder simultaneously. a) The system should have minimum 100 TB of storage capacity and should be modularly expandable 	User/ DCPW to test
11 AVLS : GIS INTERFACE FOR CALL-TAKING AND DISPATCHING	The AVLS System should be capable of providing the following basic features:	User/ DCPW to test
11.1	Shall be capable of displaying a map with the geo-code at the centre of the map display window and at a predefined scale based on a predefined display screen rules.	User/ DCPW to test
11.2	Shall be capable of locating and displaying geographical information using defined attribute type	User/ DCPW to test
11.3	Map Query: Shall undertakes a number of queries based upon specific map features to determine: <ul style="list-style-type: none"> a. Street/road and cross-street/road names. b. Co-ordinate positions. c. Address ranges. d. Database information associated with a graphic symbol. 	User/ DCPW to test
11.4	Map Grid: Shall be capable of continuously reporting one or more of the following grid references (to the Dispatcher's screen) as the Dispatcher moves the cursor: Latitude and longitude.	User/ DCPW to test
11.5	Resource symbols shall be able to be automatically placed on the map display at the location as	User/ DCPW to test

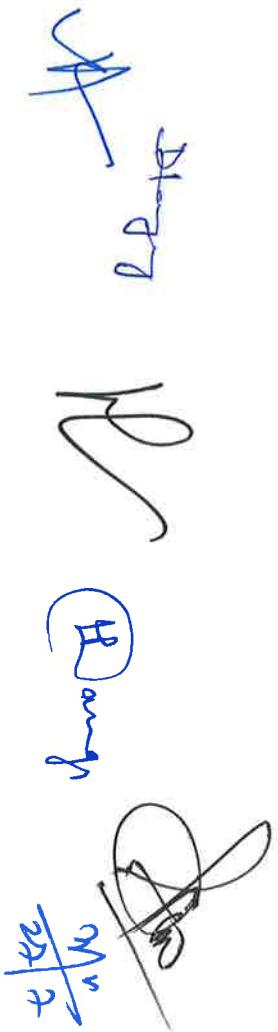
TETRA Radios

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	reported from Automatic Vehicle Location. For the continuous streaming of coordinates, the system shall be able to continuously update the vehicle symbol as the coordinates are received from the Automatic Vehicle Location (AVL).
11.6	The incident and resource symbols should be able to be colour coded and have that colour automatically updated as the status-changes.
12	Health Status: Health Status of Remote radio should be available in NMS.

The above equipments may be procured as per GFR-2017.

TETRA Radios



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27.07.2017

ORs of RADIO TRUNKING SYSTEM – TETRA Technology

C. DIGITAL HANDHELD RADIO :

S.I. No.	SPECIFICATIONS	Trial Directives
1	GENERAL	
1.1	Frequency Range	400 MHz Band OR 800 MHz Band
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band
1.3	TDMA	4 – Slot
1.4	Operation Modes	TETRA Standard
1.7	Emission	21K0D1W
1.5	Number of Channel	1000 or better
1.6	Channel Spacing	25 kHz
1.7	Number of contacts (individual / group call numbers)	1000 or better
1.8	Battery Capacity	Li-ion/Li-Poly rechargeable battery of capacity 2000 mAh or higher capacity. Bidder to specify the specific voltage
1.9	Frequency Stability	±1.5 PPM or better
1.10	Display	Alphanumeric
1.11	VSWR	Better than 1.5
1.12	Protection	Reverse Polarity and High VSWR
1.13	Interoperability with minimum two vendors	IOP Certification from Technical Working Group (TWG) of the TETRA Association
2	TRANSMITTER	
2.1	RF Power Output	1 W or better
2.2	Digital Modulation	$\pi/4$ -QDPSK
2.4	FM Hum & Noise	-40 dB or better at 25 KHz
2.5	Adjacent Channel Power	-60 dBc or better at 25 KHz

TETRA Radios

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	Audio Response	+1,-3dB	User/ DCPW to test
2.7	Digital Vocoder	ACELP	User/ DCPW to test
3	RECEIVER		
3.1	Sensitivity (Analog)	0.30µV (12dB SINAD)or better	User/ DCPW to test
3.2	Sensitivity (Digital)	0.30µV at 5% BER or better	User/ DCPW to test
3.3	Adjacent Chanel Selectivity	60dB or better at 25 KHz	User/ DCPW to test
3.4	Inter-modulation	70dB or better	OEM Certification supported by International Recognised Laboratory
3.5	Audio Output	Minimum 500m W	User/ DCPW to test
3.6	Audio Distortion	Less than 3%	User/ DCPW to test
4	GPS		
4.1	Time to first fix cold Start	<2 Minutes	User/ DCPW to test
4.2	Time to first fix hot Start	< 20 Second	User/ DCPW to test
4.3	Horizontal accuracy	< 10 Meter	User/ DCPW to test
5	ENVIRONMENTAL		
5.1	Operating Temperature	-30°Cto+55°C	OEM Certification supported by International Recognised Laboratory
5.2	Storage Temperature	-40°Cto+70°C	
5.3	Humidity	95% Max. at +20° C non-condensing	
5.4	Vibration	MIL-STD -810 F/G	
5.5	Shock & Drop	MIL-STD -810 F/G	
5.6	Water intrusion & Dust	MIL-STD -810 F/G & IP-67	
5.7	Salt	MIL-STD -810 F/G	
5.8	Rain	MIL-STD -810 F/G	
5.9	Low Pressure	MIL-STD -810 F/G	

TETRA Radios


Mr.

John F. Donegan

~~John F. Donegan~~

~~John F. Donegan~~

John F. Donegan

27.07.2017

13

CCESSORIES	
Battery Charger	
Input Voltage	230V \pm 10%, 50 Hz
Output Voltage	As per battery pack (Information will be provided by OEM / Vendor)
Type of Battery Charger	Li-Ion / Li-poly
Protection	<ul style="list-style-type: none"> 1. Reverse Polarity Protection 2. Short Circuit Protection
Indication	Visual Indication for all modes of charging status
Charging Time	<ul style="list-style-type: none"> Standard Charger – 6 to 14 hrs Rapid Charger – 1 to 3 hrs
No. of charging pockets	1 / 2 / 6 (Vendor to quote accordingly)
Hands free Kit (VOX unit with PTT) (Optional)	<p>The offered sets should be compatible with minimum any of the two or more variants</p> <ul style="list-style-type: none"> 1. Bone Conduction 2. Ear Plug 3. Headphone, etc
Programming Kit	All necessary Software and Hardware required for programming of the set independently for lifelong support with regular updates.
Leather Case	One good quality leather case with belt clip and shoulder strap.
No. of Battery	Two Li-ion or Li-poly batteries with each radio sets.
Literature	<ul style="list-style-type: none"> a) User manual with each radio sets should be provided free of cost in soft as well as hard copy. b) Technical repairing manual, with complete block diagram, circuit layout, PCB layout, component & wiring diagram etc should be provided as per user's requirement in soft as well as hard copy.






QRS of RADIO TRUNKING SYSTEM – TETRA Technology

D. DIGITAL MOBILE RADIO :

S.L.No.	SPECIFICATIONS	Trial Directives
1	GENERAL	
1.1	Frequency Range	400 MHz Band OR 800 MHz Band
1.2	Duplex Spacing	10 MHz for 400 MHz Band 45 MHz for 800 MHz Band
1.3	TDMA	4 – Slot TETRA Standard
1.4	Operation Modes	TETRA Standard
1.7	Emission	21K0DIW
1.5	Number of Channel	1000 or better
1.6	Channel Spacing	25 kHz
1.7	Number of contacts (individual / group call numbers)	1000 or better
1.8	Operating Voltage	11.25 VDC
1.9	Frequency Stability	±1.5 PPM or better
1.10	Display	Alphanumeric
1.11	VSWR	Better than 1.5
1.12	Protection	Reverse Polarity and High VSWR
1.13	Interoperability with minimum two vendors	IOP Certification from Technical Working Group (TWG) of the TETRA Association
2	TRANSMITTER	
2.1	RF Power Output	Minimum 25 W for all bands
2.2	Digital Modulation	$\pi/4$ QDPSK
2.3	Modulation Deviation	±2.5 kHz at 25 kHz
2.4	FM Hum & Noise	-40 dB or better at 25 KHz
2.5	Adjacent Channel Power	-60 dBc or better at 25 KHz
2.6	Audio Response	+1,-3dB
2.7	Digital Vocoder	ACELP
TETRA Radios		

27.07.2017

3 RECEIVER	
3.1 Sensitivity (Analog)	0.30µV (12dB SINAD)or better
3.2 Sensitivity (Digital)	0.30µV at 5% BER or better
3.3 Adjacent Chanel Selectivity	60dB or better at 12.5 KHz
3.4 Inter-modulation	70dB or better
3.5 Audio Output	
3.6 Audio Distortion	Minimum 3 W Less than 3%
4 GPS	
4.1 Time to first fix cold Start	<2 Minutes
4.2 Time to first fix hot Start	< 20 Second
4.3 Horizontal accuracy	< 10 Meter
5 ENVIRONMENTAL	
5.1 Operating Temperature	-30°Cto+55°C
5.2 Storage Temperature	-40°Cto+70°C
5.3 Humidity	95% Max. at +20° C non-condensing
5.4 Vibration	MIL-STD -810 F/G
5.5 Shock & Drop	MIL-STD -810 F/G
5.6 Water intrusion & Dust	MIL-STD -810 F/G & IP-54
5.7 Salt	MIL-STD -810 F/G
5.8 Rain	MIL-STD -810 F/G
5.9 Low Pressure	MIL-STD -810 F/G

Note:-

1. The Technical Specifications & Trial Directives may be used for procurement as per the applicable GFR or State Financial Rules.

Technical Specifications may slightly be modified by user organisations for specific requirement, if any, with the approval of competent authority.

TETRA Radios






















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2. User Organisations may ask the vendors for lifetime support for supplied Software updates / patches , Warranty and Spare support as per the need.

3. If required, submitted OEM Certificates results may be verified from the available certified laboratories.

(Prem Dang)
Deputy Superintendent of Police,
Haryana Police

(Amar Singh Meena)
Assistant Commissioner of Police,
Delhi Police

(Rajesh Erka)
Deputy Director,
DCPW

(P R Jha)
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(R K Verma)
Deputy Director,
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(D. Mukhopadhyay)
Joint Director,
DCPW

(N S J Lakshmi)
Deputy Inspector General,
Andhra Pradesh Police

(Devendra Singh)
Additional Director,
DCPW

No. B.V-7/2012-13 (QRs)
भारत सरकार/Government of India
गृह मंत्रालय/Ministry of Home Affairs
पुलिस आधुनिकीकरण प्रभाग /Police Modernization Division
संभरण-I डेस्क /Prov.I Desk

26, Man Singh Road, Jaisalmer House,
New Delhi, the 2nd October, 2014

To,

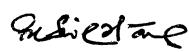
The DsG: AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject: Revised Trial Directives of Digital Hand Held VHF Transceiver Set, Digital VHF Base/Mobile Transceiver Set and Digital VHF Repeater Set.

The undersigned is directed to refer to the subject mentioned above and to say that the revised Trial Directive in respect of Digital Hand Held VHF Transceiver Set, Digital VHF Base/Mobile Transceiver Set and Digital VHF Repeater Set as per Appdx-A, B & C respectively have been approved by the competent authority in MHA.

2. Concerned CAPF will be responsible for correctness of QRs.
3. Henceforth, all the CAPFs should procure the above items, required by them strictly as per the laid down Technical Specification/QRs.
4. Trial Directives of Digital Hand Held VHF Transceiver Set, Digital VHF Base/Mobile Transceiver Set and Digital VHF Repeater Set issued earlier vide letter of even No. dated 22.08.2013 is rescinded.

Yours faithfully,


(P.K. Srivastava)
Under Secretary to the Govt. of India

Encl: As above.

Copy forwarded for necessary action to:

SO (IT), MHA - with the request to host the revised Trial Directives on official website of MHA (under the page of Organizational Set up, Police Modernization Division) and remove earlier trial Directives vide letter of even number dated 22.08.2013(http://mha.nic.in/sites/upload_files/mha/files/QRSTrialDir_VHF_230813.pdf). Soft copy is being sent through email also.

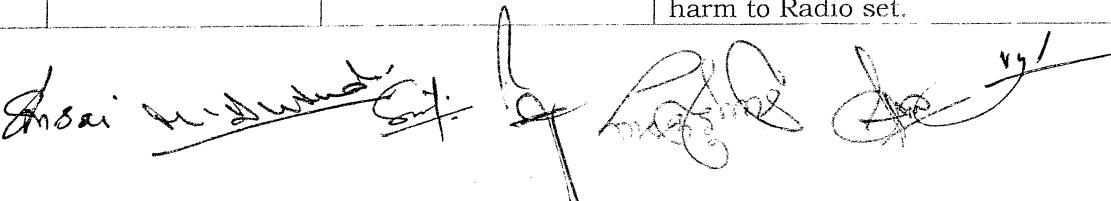

(R. K. Soni)
Section Officer (Prov-I)

Copy to: Director (Procurement), MHA

326 .22

TRIAL DIRECTIVE FOR DIGITAL HAND HELD VHF TRANSCEIVER SET

Sl No	Parameters	Specification	Trial/Test Procedure
1.	General		
	i) Frequency Range	136-174 MHz (Full Band)	Functional check ; B.O.O will check operation of radio set by programming lowest, highest and any random frequency in 136-174 MHz range with the help of measuring instruments.
	ii) No. of channel	255 or higher	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	iii) Channel Spacing	12.5 KHz or better	
	iv) Frequency Stability	± 1.5 PPM or better	
	v) Protocol & Technology	Digital TDMA or FDMA Technology or better User organization may decide protocol and technology as per their requirement/ choice.	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	vi) Type of Emission (Modulation)	Analog ; 11K0F3E Digital;4FSK or equivalent technique complying to open standard/non proprietary Digital Protocol as defined by an international standards body like ETSI / FCC etc.	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	vii) Type of Operation	Simplex, press to talk	Simplex means set either work in receive mode or in transmit mode. Same will be checked practically.
	viii) Type of Antenna	Rugged flexible Helical Antenna	B.O.O will check Physically and Practically to assess fitment, flexibility & ruggedness of antenna.
	ix) Weight	Less than 450 grams with battery.	B.O.O. will check practically to measure weight by weighing machine.
	x) Power Source	Ni-Mh or Lithium-ion or Li-polymer battery pack of 2000 mAH or more with belt clip (Bidder shall mention DC Voltage and Chemistry).	Physical check to assess type, make & voltage/capacity of battery and it should be as per specification. In addition Firm must produce certificate of any Govt. accredited Lab. or NABL or ILAC approved laboratory.
	xi) Protection	(i) Reverse polarity protection (ii) Protection against high VSWR	i) B.O.O will check it by connecting Radio set with DC supply in reverse polarity and switch the set to "ON" position. There should not be any harm to the Radio Set. ii) B.O.O will check by switching "ON" Radio set and removing antenna/ dummy load and PTT be pressed. In such a condition there should not be any harm to Radio set.



Cont..P/2

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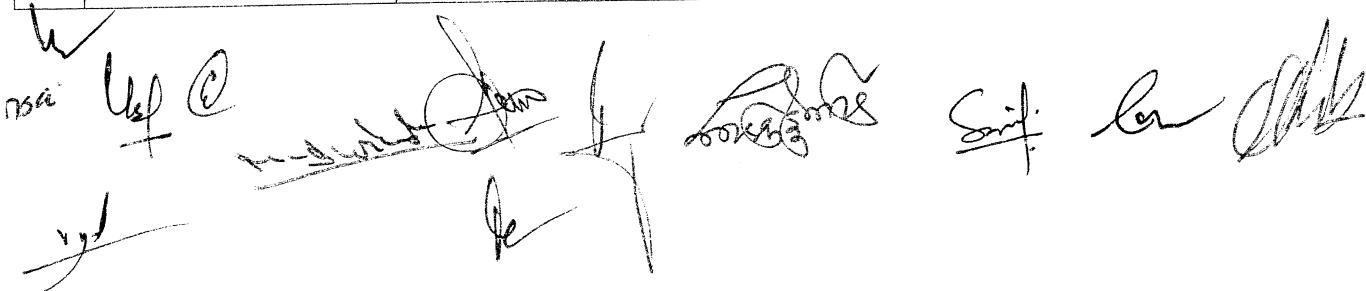
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2. Transmitter		Amended Trial Directive
i) R.F Power output	1/5 Watt (Programmable /Selectable)	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
ii) FM Hum / Noise	-40 dB or better	
iii) Modulation Limiting	$\pm 2.5 \text{ KHz}$ @ 12.5 KHz	
iv) Adjacent Channel Power	-60 db or better	
v) Audio Distortion	Less than 3%	
3. Receiver		
i) Sensitivity	i) Analog :- $0.30\mu\text{V}$ for 12 dB SINAD or better ii) Digital : - $0.30\mu\text{V}$ at 5% BER or better	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
ii) Selectivity (Adjacent channel)	60 dB or better	
iii) Inter Modulation	60 dB or better	
iv) Audio Output	500 mW	
v) Audio Response	+1,-3 dB	
vi) Rated Audio Distortion	Less than 3%	
4. Environmental Specification		Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
i) Operating Temperature	-30°C to + 60 °C	
ii) Storage Temperature	-40°C to + 70 °C	
iii) Humidity	Max. 95% @ +40°C non-condensing	
iv) Environmental standard (i.e) Low & High Temperature, Low pressure, Temperature Shock, Solar Radiation, Rain, Salt Fog, Vibration, Dust & Shock		Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory for the desired or better MIL standard.
v) Dust & Water Intrusion	IP 57 or better	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
5. Accessories		
i) Battery Charger	Single unit smart charger (capable to charge Lithium-Ion, Ni-MH, Lithium-Polymer batteries.	B.O.O will check it practically by charging the batteries from smart charger and note down whether the batteries are charge properly or otherwise.
ii) Hands free Kit (VOX unit with PTT) (optional)	The vendor should provide minimum of two variants for trials	Check Practically by connecting Hands free kit with radio set. By making voice call Radio set should start transmission without pressing PTT. On 'no speech' Radio set should switch automatically to reception mode.
iii) Programming kit	All necessary software and hardware required for programming of the set	Check Practically to assess that all necessary software and hardware required for programming of the set is available and working properly.

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iv) Literature	i) Users manual with each radio sets should be provided free of cost in soft as well as hard copy. ii) Technical repairing manual with complete block diagram, circuit layout etc should be provided as per users' requirement in soft as well as hard copy.	Physically check to confirm that User and Technical manual are available in Hard as well as in Soft Copy.
v) Battery	Two extra Lithium -ion or Ni-Mh or li-polymer batteries with each Radio Set	Physical/Practical check to assess that extra battery is as per specification, compatible with Radio set and working properly.
vi) Leather case (Optional)	One good quality leather case with belt clip & shoulder strip.	Practically/ physically check by inserting radio set in it to assess that radio set can be easily inserted in leather case. Leather case should have belt clip and shoulder strip of sufficient length.
6. Configuration		
i) Caller ID display	Should be available	B.O.O will check it by programming two radio sets on same frequency and different ID. Make call from one radio and check display in another radio set, ID of caller radio should be displayed.
ii) Facility for locking the channel or key pad locking	Should be available	Program locking channel or key pad facilities in radio set and check whether the channel or key pads locked or otherwise.
iii) Scan with priority	Should be available	Radio sets programmed with priority scanning on pressing the scan button, will starts scanning channels with the priority.
iv) Transmitter Time Out Timer (TOT)	The time should be programmed to best suit the application	PTT of Radio set pressed continuously. Radio set comes automatically in reception mode after completion of time programmed for TOT option.
v) LCD Display	Should be available	Practical /Physical check by switching on the radio set, there should be display on the LCD screen.
vi) Mode of calls	Selective Call, Group Call, Inter and Intra Group call facility	B.O.O. will check it practically by making call.
vii) Remote Radio Kill / Stun /Revive facility	Should be available	B.O.O. will check it practically by sending kill command to particular radio. Radio set received kill command will get killed. Similarly, Set should revive if we send the revive command to killed radio.


 A series of handwritten signatures and initials are visible at the bottom of the page, appearing to be approval or review marks. The signatures are in cursive and include letters like 'nsa', 'Lef C', 'Jain', 'Suresh', 'Smt. Lax', and 'A'. There are also some smaller, less legible marks and lines.

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viii) Mode of operation	Radio should operate in analog mode and digital mode. (Compatible with existing all type of VHF analogue radio sets viz : Motorola, Icom, Kenwood, Vertex etc)	B.O.O will be check practically by making call from existing analog sets to digital set after setting it in Analog mode and vice -versa. For checking interoperability with existing digital radio system, if available, make calls between them and the proposed radio sets (in digital mode) and verify. Proper communication should happen if both digital radio systems are based on same technology.
ix) Emergency Button	Allows a user to obtain help in critical situations.	B.O.O. will check it practically by pressing emergency button.
x) SMS Texting	Should be capable of sending pre defined messages & short messages from keypad as Optional.	B.O.O. will check it practically by sending pre-defined messages from one radio to another. Message should be displayed on the screen of receiving radio.
xi) Programming	Front panel programming with password protection or PC programming.	B.O.O. will check it practically by programming radio from front panel having password protection. Similarly, Board will also program radio with the help of PC. Radio set should be programmed from front panel as well as from PC also.
xii) DTMF front panel key pad with back lit	Should be available	B.O.O. will check it Physically/ Practically that radio set is having DTMF key pad with back lit.
xiii) Battery strength bar	Should be available	B.O.O. will check it practically that battery strength bar indicates the strength bar as increasing / decreasing when battery is charged/ discharged.
xiv) Support GPS	Inbuilt GPS system with accuracy of less than 10 meters.(Optional-As per user requirement)	Firm will demonstrate features related with GPS, GIS and Networking mentioned at Sl No.6 xiv) to xvi) to Board of Officers during the trial and all function should work as per requirement.
xv) GIS	Radio should have Application protocol interface along with software applications to provide locations and messaging on PC/ Console. (Optional-As per user requirement)	
xvi)Networking	Should be IP based for automatic roaming etc. (Optional-As per user requirement)	

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7	Field Trial	The actual performance of the radio set will be assessed.	Field trial of equipment will be conducted by a Board of Officers in the operational area of the force in the presence of Vendor/representative of firms to ascertain the user satisfaction before the proposal is accepted. Radio equipment with all required accessories will be provided by the participating firm's on " No Cost No Commitment " basis at the indenter discretion.
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Sohrab Ansari

(Sohrab Ansari, SI/Exe, CISF)

R.K. Khumbhare

(R.K. Khumbhare, AC, SSB)

M.S. Yadav

(M.S. Yadav, AC, CRPF)

O.S. Chauhan

(O.S. Chauhan, AC, NSG)

Gautam Kumar

(Gautam Kumar AC, ITBP)

Brajesh Kumar

(Brajesh Kumar, DC, BSF)

Rajesh Ekka

(Rajesh Ekka, DD, DCPW)

Lt. Col Rajnish Kishore

(Lt. Col Rajnish Kishore, AR)

Sumit Gupta

[Sumit Gupta, Sciehtist "PSO (E)", BPR&D]

Dr. Mayank Dwivedi

(Dr. Mayank Dwivedi Sc."F" DLIC/DRDO)

Virendra Agrawal

[Virendra Agrawal, DIG (Eqpt), CRPF]

Mahesh Kumar

[Mahesh Kumar, DIG(Comn), CRPF]

Shailendra Kumar

[Shailendra Kumar, IG (Comn), CRPF]

Approved/Not Approved

(Dilip Trivedi, IPS)
(DG, CRPF)

TRIAL DIRECTIVE FOR DIGITAL VHF BASE/MOBILE TRANSCEIVER SET

Sl No	Parameters	Specification	Trial/Test Procedure
1.	General		
	i) Frequency Range	136-174 MHz (Full Band)	Functional check: B.O.O will check operation of radio set by programming lowest, highest and any random frequency in 136-174 MHz range with the help of measuring instruments.
	ii) No. of channel	255 or higher	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	iii) Channel Spacing	12.5 KHz or better	
	iv) Frequency Stability	± 1.5 PPM or better	
	v) Protocol & Technology	Digital TDMA or FDMA Technology or better (User organization may decide protocol & Technology as per their requirement/ choice)	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	vi) Type of Emission (Modulation)	Analog; 11K0F3E Digital ; 4 FSK or equivalent technique complying to open standard / non proprietary Digital Protocol as defined by an international standards body like ETSI / FCC etc.	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory..
	vii) Type of Operation	Simplex, press to talk	Simplex means set either works in receive mode or in transmit mode. Same will be checked practically.
	viii) Weight	Less than 2000 grams	B.O.O. will check practically to measure weight by weighing machine.
	ix) Power Source	13.8 Volt DC ± 15%	Apply 13.8VDC ±15% from power supply and check that whether set is working properly or otherwise.
	x) Protection	(i) Reverse polarity protection (ii) Protection against high VSWR	i) B.O.O will check it by connecting Radio set with DC supply in reverse polarity and switch the set to "ON" position. There should not be any harm to the Radio Set. ii) B.O.O will check by switching "ON" Radio set and removing antenna/ dummy load and PTT be pressed. In such a condition there should not be any harm to Radio set.

2.	Transmitter	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	i) R.F Power output	25 Watt Programmable /Selectable)
	ii) FM Hum /Noise	-40 dB or better
	iii) Modulation Limiting	$\pm 2.5 \text{ KHz}$ @ 12.5 KHz
	iv) Adjacent Chanel power	-60 db or better
	v) Audio Distortion	Less than 3%
3.	Receiver	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	i) Sensitivity	i) Analog:- $0.30 \mu\text{V}$ for 12 dB SINAD or better ii) Digital :- $0.30 \mu\text{V}$ at 5% BER or better
	ii) Selectivity (Adjacent channel)	60 dB or better.
	iii) Inter Modulation	70 dB or better
	iv) Audio Output	3 W or more
	v) Audio Response	+1,-3 dB
	vi) Rated Audio Distortion	Less than 3%
4.	Environmental Specification	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	i) Operating Temperature	-30°C to + 60 °C
	ii) Storage Temperature	-40°C to + 70 °C
	iii) Humidity	Max. 95% @ +40°C non-condensing
	iv) Environmental standard (i.e) Low & High Temperature , Low pressure, Temperature Shock, Solar Radiation, Rain, Salt Fog, Vibration, Dust & Shock	As per MIL 810 C,D,E,F
	v) Dust & Water Intrusion	IP 54 or better
5.	Accessories	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	i) Microphone	DTMF Microphone should be supplied with Radio
	ii) Battery cable & Mounting fixtures	Should be supplied with Radio
		Physically check by connecting battery cable & mounting fixtures with radio.

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	iii) Antenna	i) 0dB/3dB gain whip antenna with 3 meters. Co-axial cable with connector, magnetic base/ mounting bracket for vehicle use will be provided as per user's requirements. ii) 3dB/6dB gain Omni Directional antenna with 30 meter RF Cable for base station will be provided as per user's requirements.	Physically check by connecting antenna with all its accessories with radio set and check serviceability whether antenna matched or not.
	iv) Programming kit	All necessary programming software and hardware required for the set will be provided as per user's requirements.	Practically check to assess that all necessary software and hardware required for programming are available and working properly.
	v) Literature	i) Users manual with each radio sets should be provided free of cost in soft as well as hard copy. ii) Technical repairing manual with complete block diagram, circuit layout etc should be provided as per users' requirement in soft as well as hard copy.	Physically check to confirm that User and Technical manual are available in Hard as well as in Soft Copy.
6	Configuration		
	i) Caller ID display	Should be available	By Programming two radio sets with same frequency and different ID. And Making call from one radio and check display in another radio set, ID of caller radio should be displayed.
	ii) Busy channel lock out	Should be available	Programmed one radio with busy channel lock out option and make call from another radio on same frequency. In the mean time if we want to make call from first radio, its transmitter will remain disable till PTT of second radio is released.
	iii) Scan priority	Should be available	Radio sets programmed with priority scanning on pressing the scan button will start scanning channels with the priority.
	iv) Transmitter Time Out Timer (TOT)	The time should be programmed to best suit the application.	iv) PTT of Radio set programmed with TOT option be pressed continuously. Radio set comes automatically in reception mode after completion of time programmed for TOT option.
	v) LCD Display	Should be available	Practical/Physical check by switching on the radio set, there should be display on the LCD screen.
	vi) Mode of calls	Selective Call, Group Call, Inter and Intra Group call facility	B.O.O. will check it practically by making call.

1. Mr. Uday Chandra
 2. Mr. S. R. Rao
 3. Mr. S. Venkateswaran
 4. Mr. S. Venkateswaran
 5. Mr. S. Venkateswaran
 6. Mr. S. Venkateswaran

1. Mr. S. Venkateswaran
 2. Mr. S. Venkateswaran
 3. Mr. S. Venkateswaran
 4. Mr. S. Venkateswaran
 5. Mr. S. Venkateswaran
 6. Mr. S. Venkateswaran

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vii) Remote Radio Kill / Stun /Revive facility	Should be available	B.O.O. will check it practically by sending kill command to particular radio. Radio set received kill command will get killed. Similarly, Set should revive if we send the revive command to killed radio.
viii) Mode of operation	Radio should operate in analog mode and digital mode. (Compatible with existing all type of VHF analogue radio sets viz ::Motorola, Icom, Kenwood, Vertex etc)	B.O.O will be check practically by making call from existing analog sets to digital set after setting it in Analog mode and vice -versa. For checking interoperability with existing digital radio system, if available, make calls between them and the proposed radio sets (in digital mode) and verify. Proper communication should happen if both digital radio systems are based on same technology.
ix) Emergency Button	Allows a user to obtain help in critical situations.	B.O.O. will check it practically by pressing emergency button.
x) SMS Texting	Should be capable of sending pre defined messages & short messages from keypad as Optional.	B.O.O. will check it practically by sending pre-defined messages from one radio to another. Message should be displayed in the screen of receiving radio.
xi) Programming	Front panel programming with password protection or PC programming	B.O.O. will check it practically by programming radio from front panel having password protection. Similarly Board will also programmed radio with the help of PC. Radio set should be programmed from front panel as well as from PC also.
xii) Support GPS	Inbuilt GPS system with accuracy of less than 10 meters. (Optional-As per user requirement)	Firm will demonstrate features related with GPS, GIS and Networking mentioned at Sl No.6-(xii to xiv) to Board of Officers during trail).
xiii) Networking	Should be IP based for automatic roaming etc.(Optional-As per user requirement)	
xiv) GIS	Radio should have Application protocol interface along with software applications to provide locations and messaging on PC/Console. (Optional-As per user requirement)	

7. Field Trial	The actual performance of the radio set will be assessed.	Field trial of equipment will be conducted by a Board of Officers in the operational area of the force in the presence of Vendor/ representative of firms to ascertain the user satisfaction before the proposal is accepted. Radiq equipment with all required accessories will be provided by the participating firm's on " No cost No Commitment " basis at the indenter discretion.
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(Sohrab Ansari, SI/Exe, CISF)

(R.K. Khumbhare, AC, SSB)

(M.S. Yadav, AC, CRPF)

(O.S. Chauhan, AC, NSG)

(Gautam Kumar, AC, ITBP)

(Brajesh Kumar, DC, BSF)

(Rajesh Ekka, DD, DCPW)

(Lt. Col Rajnish Kishore, AR)

[Sumit Gupta, Scientist "PSO (E)", BPR&D]

(Dr. Mayank Dwivedi Sc. "F" DLIC/DRDO)

[Virendra Agrawal, DIG (Eqpt), CRPF]

[Mahesh Kumar, DIG(Comn), CRPF]

[Shailendra Kumar, IG (Comn), CRPF]

(Dilip Trivedi, IPS)
(DG, CRPF)

Approved/Not Approved

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TRIAL DIRECTIVE FOR DIGITAL VHF REPEATER SET

316 Appdx "C"

Sl No.	Parameters	Specifications	Trial/Test Procedure
1	General		
i)	Frequency Range	136-174 MHz (Full Band)	Functional check : B.O.O will check operation of radio set by programming lowest, highest and any random frequency in 136-174 MHz range with the help of measuring instruments.
ii)	No. of channel	16 or more	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
iii)	Channel Spacing	12.5 KHz or better	
iv)	Frequency Stability	± 1.5 PPM or better	
v)	Protocol & Technology	Digital TDMA or FDMA Technology or better(User organization may decide protocol & Technology as per their requirement/ choice)	B.O.O will check all these parameters with the help of standard testing instruments If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
vi)	Type of Emission (Modulation)	Analog ; 11K0F3E Digital;4FSK or equivalent technique complying to open standard / non proprietary Digital Protocol as defined by an international standards body like ETSI / FCC etc.	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
vii)	Weight	Less than 15 Kg	B.O.O. will check Physically to measure the weight by weighing machine.
viii)	Power Source	i) DC -13.8 Volt ± 15% ii) AC-230 Volt ± 15%,50Hz iii) There should be provision to shift automatically on DC supply during mains failure & when mains supply restored it should be shifted on mains from DC supply	Apply 230 VAC ±15% and 13.8VDC ±15% one by one and check that whether set is working properly or otherwise.

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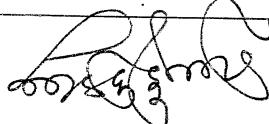
	xii) Protection	(i) Reverse polarity protection (ii) Protection against high VSWR	i) B.O.O will check it by connecting Radio set with DC supply in reverse polarity and switch the set to "ON" position. There should not be any harm to the Radio Set. ii) B.O.O set be switched "ON" removing antenna/ dummy load and PTT be pressed. In such a condition there should not be any harm to Radio set.
2	Transmitter		B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	i) R.F Power output	45 Watt or more (Programmable/ Selectable)	
	ii) FM Hum / Noise	-40 dB or better	
	iii) Modulation Limiting	$\pm 2.5 \text{ KHz}$ @ 12.5 KHz	
	iv) Adjacent Chanel Power	-60 dB or better	
	v) Audio Distortion	Less than 3%	
3	Receiver		B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	i) Sensitivity	i) Analog:- 0.30 μV for 12 dB SINAD or better ii) Digital :- 0.30 μV at 5% BER or better	
	ii) Selectivity (Adjacent channel)	60 dB or better	
	iii) Inter Modulation	70 dB or better	
	iv) Audio Response	+1,-3 dB	
	v) Rated Audio Distortion	Less than 3%	
4	Environmental Specification		Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	i) Operating Temperature	-30°C to + 60 °C	
	ii) Storage Temperature	-40°C to + 70 °C	
	iii) Humidity	Max. 95% @ +40°C non-condensing	
5	Networking	Should be capable to support IP site connects.	Firm will show Networking and Interfaces related function of repeater practically by connecting it in user organization network.
6	Interfaces	Ethernet port RJ-45 to provide a) Wide area IP connectivity for Voice and Data. b) Remote monitoring and status check.	
7	Accessories		
	i) Battery cable & Mounting fixtures	Should be supplied with Repeater	B.O.O. will check it practically by connecting battery cable & mounting fixtures with repeater.
	ii) Antenna	3dB/6dB gain, Omni Directional antenna with 45 meter RF Cable RG-217 for base station will be provided as per user's requirements.	B.O.O. will check it practically by connecting antenna & accessories with repeater. During transmission there should be no mismatch between radio and antenna.

*Jaswan**Ajay**Chaitanya**S. S.**S. S.*

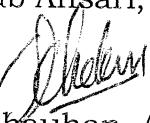
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	iii) Programming kit	All necessary programming software and hardware required for the set will be provided as per user's requirements.	B.O.O. will check it practically that all necessary programming software and hardware are available as per user requirement.
	iv) Literature	i) Users manual with each radio sets should be provided free of cost in soft as well as hard copy. ii) Technical repairing manual with complete block diagram, circuit layout etc should be provided as per users' requirement in soft as well as hard copy.	B.O.O will check it Physically that user and technical manual are available as per user requirement.
8.	Field Trial	The actual performance of the radio set will be assessed.	Field trial of equipment will be conducted by a Board of Officers in the operational area of the force in the presence of Vendor/ representative of firms to ascertain the user satisfaction before the proposal is accepted. Repeater equipment with all required accessories will be provided by the participating firm's on " No cost No Commitment " basis at the indentor discretion.


(Sohrab Ansari, CISF)


(R.K. Khumbhare, AC, SSB)


(M.S. Yadav, AC, CRPF)


(O.S. Chauhan, AC, NSG)

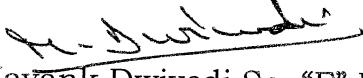

(Gautam Kumar AC, ITBP)


(Brajesh Kumar, DC, BSF)

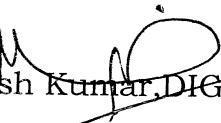

(Rajesh Ekka, DD, DCPW)

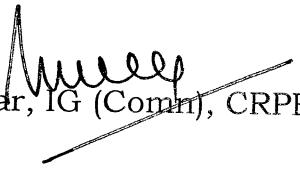

(Lt. Col Rajnish Kishore, AR)


(Sumit Gupta, PSO(E), BPR&D)

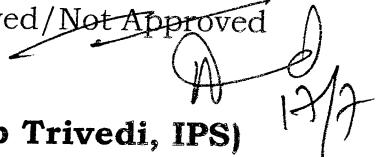

(Dr. Mayank Dwivedi Sc. "F" DLIC/DRDO)


(Virendra Agrawal, DIG (Eqpt), CRPF)


(Mahesh Kumar, DIG (Comm), CRPF)


(Shailendra Kumar, IG (Comm), CRPF)

Approved / Not Approved


(Dilip Trivedi, IPS)
(DG, CRPF)

No. B.V-7/2015-16-C (QRs)-(3) / 550
भारत सरकार/Government of India
गृह मंत्रालय/Ministry of Home Affairs
पुलिस आधुनिकीकरण प्रभाग /Police Modernization Division
संभरण-I डेस्क /Prov.I Desk

26, Man Singh Road, Jaisalmer House,
New Delhi, the 7th Aug, 2015

To,

DsG: AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject: Trial Directives of Digital UHF Radio Sets (Hand Held, Mobile and Repeater Sets).

The undersigned is directed to refer to the subject mentioned above and to say that the Trial Directive in respect of Digital UHF Radio Sets (Hand Held, Mobile and Repeater Sets) as per Appendix-'A", "B" & "C" respectively have been approved by the competent authority in MHA.

2. Henceforth, all the CAPFs should procure the above items, required by them strictly as per the laid down Technical Specification/QRs.

*Issued
10/08/2015*

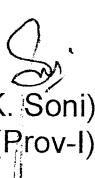
Yours faithfully,

(M. N. Sukole)
Under Secretary to the Govt. of India

Encl: As above.

Copy forwarded for necessary action to:

SO (IT), MHA - with the request to host the Trial Directives of Digital UHF Radio Sets (Hand Held, Mobile and Repeater Sets) on official website of MHA (under the page of Organizational Set up, Police Modernization Division- Communication Equipment). Soft copy is being sent through email also.


(R. K. Soni)
Section officer (Prov-I)

Copy to: Director (Procurement), MHA



(6)

TDs FOR DIGITAL UHF HAND HELD TRANS RECEIVER

Appendix "A"

Sl No	Parameters	Specification	Trial Procedure
1	Frequency Range	403-470 MHz	Functional check: B.O.O will check operation of radio set by programming the lowest, highest and any random frequency in 403-470 MHz range with the help of measuring instruments.
	No of channel	256 or higher	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Channel Spacing	12.5 KHz or better	
	Frequency Stability	± 1.0 PPM or better	
	Protocol	Digital TDM /FDM Technology	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Type of Emission	Analog: 11K0F3E Digital: 4FSK or equivalent Modulation technique complying to Open Standard / non propriety Digital Protocol as defined by an international standards body like ETSI / FCC etc.	
	Type of Operation	Simplex press to talk	Simplex means set either works in receive mode or in transmit mode. Same will be checked practically.
	Type of Antenna	Helical Antenna	B.O.O will check Physically and Practically to assess fitment, flexibility & ruggedness of antenna.
	Weight	Less than 400 grams without battery	B.O.O. will check practically to measure weight by weighing machine.
	Power Source	Ni-Mh or Li-on rechargeable battery with belt clips to meet the Operating time of 8 hours with 5:5:90 duty cycle at peak conditions.	B.O.O will Physically check battery to assess type, make & voltage/capacity of battery and it should be as per specification. In addition Firm must also produce certificate of any Govt. accredited Lab. or NABL or ILAC approved laboratory.

H.P.A. D.S.E. S.R. M.V.B. M.A.L. R. Srinivas C.J.

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TDs FOR DIGITAL UHF HAND HELD TRANS RECEIVER

S1 No	Parameters	Specification	Trial Procedure
2	RF Power out put	Programmable/ switchable up to 4 watt or more	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	FM Hum /Noise	12.5KHz : 40dB or better	
	Frequency Deviation	± 2.5 KHz in 12.5 KHz spacing	
	Modulation Sensitivity	2 to 10 mV	
	Modulation Distortion	Less than 3 % @ 1 KHz	
	Modulation Fidelity	+1,-3 dB of 6dB	
	Audio Distortion	Less than 3% @ 1 KHz	
3	Sensitivity	(i) Analog: 0.3 5 μ V for 12 dB SINAD or better (ii) Digital: 0.30 μ V at 5% BER or better	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Selectivity (adjacent channel)	60 dB @12.5 KHz or better	
	Inter Modulation	60 dB or better as per ETSI standard or better	
	Audio out put	500 mW or higher	
	Audio Response	+1, -3dB of 6dB	
4	Operating Temperature	-30 to +60°C	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	Storage Temperature	-40°C to +70°C	
	Humidity	90% at 50°C (as per MIL810E)	
	Environmental Standard	MIL 810 C,D,E,F	
	Water Proof Protection	IP 54, IP 55 or better	

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TDs FOR DIGITAL UHF HAND HELD TRANS RECEIVER

Sl No	Parameters	Specification	Trial Procedure
5	Support GPS	Should be supplied with GPS with accuracy less than 15m to enable being tracked from Remote Control Station.	Firm will demonstrate features related with GPS, GIS to Board of Officers during the trial and all functions should work as per requirement.
	Support GIS	Radio should have application protocol interface along with software application to provide location and messaging on PC /Console.	
	Text Messaging	Should be capable of sending short messages from keypad and pre defined messages	B.O.O will check it practically by sending pre-defined messages from one radio to another. Message should be displayed on the screen of receiving radio.
	Front Panel LCD Display	Digital hand held radio with key pad and display.	Practical /Physical check by switching on the radio set, there should be display on the LCD screen.
	Transmitter Time out Timer (TOT)	The time can be programmed to best suit the application	PTT of Radio set be kept pressed without any break. Radio set should come in reception mode automatically after completion of programmed duration of TOT option.
	Emergency Button	Allows a user to obtain help in critical situations	B.O.O. will check it practically by pressing emergency button.
	Scan with priority facility	Should be available	Radio sets programmed with priority scanning on pressing the scan button, will start scanning channels with the priority.
	Mode of calls	Selective call, Group call, inter and intra Group call facility	B.O.O. will check it practically by establishing satisfactory call links in all required call types.
	Contact list	Contact list of more than 100 user for SMS and selective calling	The board of officers will carry out functional check.
	Remote Radio killing /stun /Revive facility	Should be available	B.O.O. will check it practically by sending kill command to particular radio. Radio set receiving kill command must get killed. Similarly, Set must revive if we send the revive command to killed radio.
	Caller ID Display	Should be available	B.O.O will check it by programming two radio sets on same frequency but with different IDs. Make call from one radio and check display in receiver radio set, ID of caller radio should be displayed.
	Networking	IP based for features like automatic roaming	The board of officers will carry out physical and functional check. The vendor to demonstrate the same with all features
	Secrecy	Should provide internet protection against casual eavesdropping	Board will Physically check.

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TDs FOR DIGITAL UHF HAND HELD TRANS RECEIVER

Sl No	Parameters	Specification	Trial Procedure
6	Battery charger	Single unit rapid charger (100% of number of sets) Four way or more charger (25% of number of sets)	B.O.O will check it practically by charging the batteries from charger and note down whether the batteries are getting charged properly or otherwise.
	Hands free kit (VOX unit with PPT)	The vendor should be provide minimum of two variants for trials	Check Practically by connecting Hands free kit with radio set. By making voice call Radio set should start transmission without pressing PTT. On 'no speech' Radio set should switch automatically to reception mode.
	Programming kit	All necessary programming software and hardware required for the set	Check Practically to assess that all necessary software and hardware required for programming of the set is available and working properly.
	Literature	i) User manual with each radio sets. ii) Technical repairing manual with complete block diagram. Circuit layout etc at a scale of 10% of equipments being procured. iii) Firm would train teams of four Operators and mechanics in handling Operating and repairing of radio receivers free of cost after procurement.	Vendor will submit user manual of each sets, technical repairing manual with complete block diagram and also provide training for a team comprising of four operators for handling of sets. The same to be mentioned in the contract documents.

Rajender Kumar
(SI/Tele, ITBP)

S.K. Thakur
(Dy. Comdt, AR)

Virendra Agrawal
DIG (Eqpt), CRPF

Suresh Pal Singh
(Insp/T, BSF)

Major. Vikram Adavant
(NSG)

J.S. Sandhu
DIG (Comm), CRPF

M.K. Singh
(AC -I, NSG)

Major Ashwani Sulhar
(NSG)

Shailendra Kumar
IG (Comm), CRPF

Sonu Sikarwar
(Asst. Comdt, CISF)

Kapil
(SSA(E), BPR&D)

Hemlal Pushp
(DY. Comdt. CRPF)

Approved/ Not Approved

(Prakash Mishra, IPS)

DG, CRPF

TDS FOR DIGITAL UHF MOBILE TRANS RECEIVER

Appendix "B"

S1 No	Parameters	Specification	Trial Procedure
1	General		
	Frequency Range	403-470MHz	Functional check: B.O.O will check operation of radio set by programming the lowest, highest and any random frequency in 403-470 MHz range with the help of measuring instruments.
	No of Channel	256 or higher	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Channel Spacing	12.5 KHz or better	
	Frequency Stability	± 1.0 PPM or better	
	Protocol	Digital technology TDM/FDM	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Type of Emission	Analog : 11K0F3E Digital : 4 FSK or equivalent Modulation technique complying to open standard / non proprietary Digital Protocol as defined by an international standards body like ETSI/FCC etc	B.O.O will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Type of operation	Simplex press to talk	Board will check practically and will ensure that, at a given point of time, set either works in receive mode or in transmit mode.

Handwritten signatures and initials are present over the bottom right of the table, appearing to be approval marks.



TDS FOR DIGITAL UHF MOBILE TRANS RECEIVER

S1 No	Parameters	Specification	Trial Procedure
	Weight without External battery & Antenna	Less than 2000 grams	Board will measure weight practically with the help of weighing machine & will ensure that it is not more than 2000 grams.
	Power Source	Typical 13.8V DC $\pm 10\%$	Apply 13.8VDC $\pm 10\%$ from power supply and check ensure that set is working properly.
	Protection	(i) Reverse polarity Protection (ii) Protection against high VSWR	i) B.O.O will check it by connecting Radio set with DC supply in reverse polarity and switch the set to "ON" position. There should not be any harm to the Radio Set. ii) B.O.O will check by switching "ON" Radio set, PTT be pressed after removing antenna/ dummy load. In such a condition there should not be any harm to Radio set.
2	Transmitter		
	RF Power output	20 watt Programmable / Selectable or more	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	FM Noise	40 dB or better (12.5 KHz)	
	Frequency Deviation	± 2.5 KHz in 12.5 KHz spacing	
	Modulation Sensitivity	2 to 10 mV	
	Modulation Distortion	Less than 3% @ 1 KHz	
	Modulation Fidelity	+1,-3 dB of 6 dB	
	Digital Modulation	4 FSK Modulation or equivalent	
3	Receiver		
	Sensitivity	(i) Analog $0.30\mu\text{V}$ for 12dB SINAD or better (ii) Digital $0.30\mu\text{V}$ at 5% BER or better	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Selective (Adjacent channel)	60dB @12.5 KHz or better	
	Inter Modulation	65 dB or better as per ETSI standard /equivalent or better	
	Audio output	3 W internal or 7.5 W external speaker 8 ohms	
	Audio Response	+1,-3dB or 6dB	

TDS FOR DIGITAL UHF MOBILE TRANS RECEIVER

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Sl No	Parameters	Specification	Trial Procedure
4	Environmental Specification		
	Operating Temperature	-30°C to + 60°C	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	Storage Temperature	-40°C to + 70°C	
	Humidity	90% at 50°C (as per MIL810E)	
5	Environmental standard	MIL 810 C,D,E & F Standards	
	Features		
	Support GPS	Should be supplied with GPS with accuracy less than 15m, to enable being tracked from Remote control station with appropriate system.	Firm will demonstrate features related with GPS, GIS and Text Messaging to Board of Officers during trail).
	Support GIS	Radio should have application protocol interface along with software application to provide location and messaging on PC /Console.	
	Text Messaging	Should be capable of sending short Messages from keypad and pre-defined Messages	
	Front Panel LCD Display	The radio should be supplied with alphanumeric display to view various setting and function of the set.	Practical/Physical check by switching on the radio set, there should be display on the Front Panel LCD screen.
	Transmitter Time out Timer (TOT)	The time should be programmed to best suit the application.	PTT of Radio set programmed with TOT option be kept pressed continuously. Radio set should come in reception mode automatically after completion of programmed duration of TOT option..
	Emergency Button	Covert emergency signaling to allow users to send help signals to user defined individual or group in critical situations.	B.O.O. will check it practically by pressing emergency button.

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 M/S SJS
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 M/S Ar Singh
 M/S

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TDS FOR DIGITAL UHF MOBILE TRANS RECEIVER

Sl No	Parameters	Specification	Trial Procedure
	Scan with priority facility	Should be available	Radio sets programmed with priority scanning on pressing the scan button will start scanning channels with the priority.
	Mode of calls	Selective call, Group call, Inter Group call and Intra Group call facility	B.O.O. will check it practically by establishing satisfactory call links in all required call types.
	Contact list	Contact list of more than 100 user for SMS and selective calling	The board of officers will carry out functional check. The vendor to demonstrate the same with all features.
	Remote Radio kill/Stun /Revive facility	Should be available	B.O.O. will check it practically by sending kill command to particular radio. Radio set receiving kill command must get killed. Similarly, Set must revive if we send the revive command to killed radio.
	Caller ID Display	Should be available	B.O.O will check it By Programming two radio sets with same frequency but with different IDs. Make call from one radio and check display in receiver radio set, ID of caller radio should be displayed.
	Networking	IP based for features like automatic roaming.	The board of officers will carry out physical and functional check. The vendor to demonstrate the same with all features.
	Secrecy	Should provide inherent protection against casual eavesdropping	Board will Physically check.
6	Accessories		
	Microphone	DTMF Microphone	B.O.O. will check physically and practically that DTMF Microphone is supplied with radio and is working properly.
	Antenna	(i) 3dB gain whip antenna with 3 Mtrs. Co-axial cable with connector, magnetic base /mounting bracket for veh. use (ii) 6dB gain Omni Directional antenna with 30 meter RF cable for base station.	Physically check by connecting antenna with all its accessories with radio set and check serviceability whether antenna matched or not.

TDS FOR DIGITAL UHF MOBILE TRANS RECEIVER

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Sl No	Parameters	Specification	Trial Procedure
	Programming Kit	All necessary programming software and hardware required for the set	Practically check to assess that all necessary software and hardware required for programming are available and working properly.
	Literature	User manual with each radio sets ii) Technical repairing manual with complete block diagram, circuit layout etc at a scale of 10% of equipments being procured. iii) Firm should train teams of four operator and mechanics in handling, operating and repairing of radio receiver free of cost after procurement.	Physically check to confirm that User and Technical manual are available in Hard as well as in Soft Copy and also provide training for a team comprising of four operators for handling of sets. The same to be mentioned in the contract documents.

Rajender Kumar
(SI/Tele, ITBP)

S.K. Thakur
(Dy. Comdt, AR)

Virendra Agrawal
DIG (Eqpt), CRPF

Suresh Pal Singh
(Insp/T, BSF)

Major. Vikram Adavant
(NSG)

J.S. Sandhu
DIG (Comn), CRPF

M.K. Singh
(AC -I, NSG)

Major Ashwani Sulhar
(NSG)

Shaileendra Kumar
IG (Comn), CRPF

Sonu Sikarwar
(Asst. Comdt,
CISF)

Kapil
(SSA(E), BPR&D)

Hem Pushp
(DY. Comdt.
CRPF)

Col. A.K. Sharma
(NSG)

Approved / Not Approved

(Prakash Mishra, IPS)
DG, CRPF

TDs FOR DIGITAL UHF 25W REPEATER

Appendix "c"

75

Sl No	Parameters	Specification	Trial Procedure
1	General		
	Frequency Range	403-470 MHz (in split band or full band)	Functional check: B.O.O will check operation of radio set by programming the lowest, highest and any random frequency in 403-470 MHz range with the help of measuring instruments.
	No of channel	Two or more	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Channel Spacing	12.5KHz or better	
	Frequency Stability	±1.0 PPM or better	
	Protocol	Digital TDM /FDM Technology	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	Type of Emission	Analog 11KOF3E Digital 4 FSK or equivalent Modulation complying to open standard/ non propriety. Digital protocol as defined by an international standards body like ETSI /FCC etc.	
	Type of Operation	Repeater Mode at 100% duty cycle	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	Weight without External battery & Antenna	Less than 18 Kgs	B.O.O. will check Physically by measuring the weight using weighing machine.
	Power source	Integrated power source with (i) Operating supply voltage 230v AC ±10%, 50Hz ±2% (ii) 12V/24V DC ±10%(negative ground) (iii) Automatic change over to battery in case of mains failure.	Apply 230 Volt AC ±15% and 13.8 Volt DC ±15% one by one and ensure that set is working properly or otherwise.

H.P.A

D.S S.J

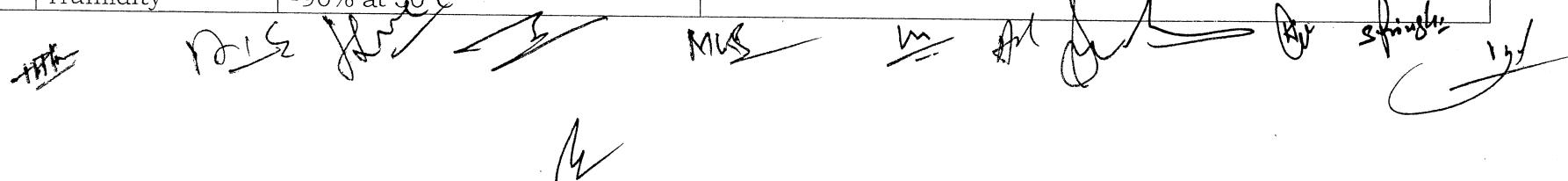
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TDs FOR DIGITAL UHF 25W REPEATER

(16)

Sl No	Parameters	Specification	Trial Procedure	
2	Transmitter			
	RF power out put	25 watts or more at 100% duty cycle	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.	
	FM Hum/Noise	12.5 KHz : 40dB or better		
	Frequency Deviation	±2.5 KHz in 12.5 KHz spacing		
	Modulation Sensitivity	2 to 10mV		
	Modulation Distortion	Less than 3% @ 1 KHz		
	Modulation Fidelity	±1,-3db of 6dB		
	Audio distortion	Less than 3%@ 1KHz		
3	Receiver			
	Sensitivity	i)Analog: 0.30µV, +12dB SINAD or better ii)Digital: 0.30 µV at 5% BER or better	B.O.O will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.	
	Selectivity (Adjacent channel)	60dB @12.5KHz or better		
	Inter Modulation	60dB or better as per ETSI stds or better		
	Audio Response	+1,-3 dB of 6 dB		
4	Environmental Specification			
	Operating Temperature	-30° C to +60° C	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.	
	Storage Temperature	-40° C to +70° C		
	Humidity	-90% at 50° C		


 Handwritten signatures and initials are present over the bottom right portion of the table, including "R.S", "M.S", "A.P", "S.M", and "13/1".

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TDs FOR DIGITAL UHF 25W REPEATER

S1 No	Parameters	Specification	Trial Procedure
5	Features		
	Networking	IP based with capability to network up to 12 or more repeater stations to enable Wide area network of user Radio set operating in the network from one network to another without manual intervention	Vendor will demonstrate Networking and Interfaces related functions of repeater practically by connecting it in user organization network.
6	Interface	Ethernet port RJ 45 to provide following: (i) Wide area IP connectivity for voice and data up to 12 Nos repeaters. (ii) Remote monitoring and status check.	
	Accessories	Carry case	Board will check carry case physically & Practically and will ensure that it is locked properly & is capable of carrying repeater.
	Antenna	6 dB gain Omni directional antenna with 30 meter flexible feeder cables with connector. Antennas should be supplied with clamping mast and supporting mast of 3M height	Board will check it practically by connecting antenna & accessories with repeater. During transmission there should be no mismatch between radio and antenna.
	Literature	(i) Users manual with each repeater sets (ii) Technical repairing manual with complete block diagram, circuit layout etc at a scale of 50% of equipments being procured.	Board will check physically and will ensure that user manual & Technical manual are as per requirement.

HHS DSE Shreemay MW UN PLS KWS Srinivas VY

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(18)

TDs FOR DIGITAL UHF 25W REPEATER


Rajender Kumar
(SI/Tele, ITBP)


S.K. Thakur
(Dy. Comdt, AR)


Virendra Agrawal
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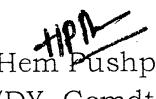

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(NSG)

Approved / Not Approved



(Prakash Mishra, IPS)

DG, CRPF